

## RESEARCH ARTICLE



# Envisioning the Invisible: Unleashing the Interplay Between Green Supply Chain Management and Green Human Resource Management: An Ability-Motivation-Opportunity Theory Perspective Towards Environmental Sustainability

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**Abstract:** The topics of green human resource management (GHRM) and green supply chain management (GSCM) have gained significant popularity within the fields of HRM and operations management, respectively. Scholars in various fields have been making progress in exploring the contributions of GSCM and GHRM towards the development of sustainable firms. However, it is worth noting that integrating these two cutting-edge topics has been significantly delayed, mostly due to a substantial gap in the integration of SCM and HRM. The objective of this study is to present a comprehensive framework that combines and enhances the interaction between these two elements, as well as to suggest a research agenda for further exploration of this integration. This study employs the ability-motivation-opportunity theory framework to examine the influence of GHRM, GSCM, and environmental strategy on firm performance. The researchers employed a structural equation model to examine the hypotheses, utilizing a sample of 640 survey questionnaires obtained from manufacturing firms. The findings indicate that there is a positive relationship between GHRM and firm performance. Additionally, the findings indicate that GSCM serves as a positive and significant mediator in the association between GHRM and firm performance. Ultimately, the study's results and ramifications are revealed to serve as valuable policy tools for various entities such as manufacturing firms, administrations, and other relevant parties of supply chain.

**Keywords:** green human resource management, green supply chain management, environmental strategy, ability-motivation-opportunity theory, firm performance

## 1. Introduction

Global environmental concerns have risen in recent years due to climate change, particularly since the industrial revolution, which has caused environmental degradation [1]. Nowadays, in the corporate environment, sustainable and environmentally friendly product image has evolved into a crucial aspect that combines methods, technological capabilities, and structures [2]. Green enterprises have been proven significantly more sustainable than their conventional counterparts in their company operations [3]. Studies reveal that the manufacturing sector in developing economies has various environmental issues; thus, organizations must examine, monitor, and enhance management-related operations [4]. In modern organizations, sustainable and environmentally friendly goods and corporate social responsibility are now integral to operations, innovation strategies, and infrastructure. Kihombo et al. [5]

discovered that companies that embraced green practices had a competitive edge in terms of cost efficiency and profitability.

To safeguard the environment from pollution, implementing green human resource management (GHRM) practices for a healthy lifestyle may provide additional advantages. The awareness of green practices helps society as a whole and demonstrates the environmentally sustainable nature of corporations. Because of rising environmental concerns, the manufacturing sector must encourage and implement GHRM practices. To acquire competitiveness and effective firm performance (FPR), GHRM practices have become crucial for effective FPR, which significantly influences competitiveness [6].

Undoubtedly, the environmental sustainability of manufacturing organizations is an increasing issue, resulting in calls for environmentally, economically, and socially responsible operations [7]. All organizations are now “must” to balance their environmental sustainability, particularly those with societal, competitive, and legal regulations [8]. These practices are inextricably connected with HRM, as human resources are the organization’s lifeblood and

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contribute to the achievement of its incorporation with ecological sustainability [9]. To motivate workers to deployment of green supply chain management (GSCM) practices in the workplace, firms are compelled to embrace green HRM practices, often known as “HRM elements of green initiatives”, due to a rising worldwide concern for the environment. GHRM is “HRM dimensions that increase beneficial environmental results” (p. 4). GHRM uses human resources while implementing GSCM practices to attain environmental sustainability, reducing waste, community involvement, and competitiveness by consistent growth and learning and by adopting ecological strategies and objectives wholly integrated with the organization’s system and objectives [10]. Numerous scholars brought attention to the topic by elaborating on the influence of GHRM (green participation, green effectiveness and greener recruiting, and remuneration) on environmental consequences. Individuals are either blessed with innate qualities or learn them via education, ultimately transforming them into human resources if given more significant consideration [11].

GSCM practices denote possibly integrating environmentally friendly practices into supply chain operations, which is favorably correlated with FPR. Introducing GSCM practices results in a global concern for participating in green activities [12]. By using the 3R concept (i.e., reducing, reusing, and recycling), firms employing GSCM principles will increase their economic performance by earning more revenues [13]. In the meanwhile, firms embracing GSCM practices may address consumer needs by offering eco-friendly goods and services, therefore strengthening customer retention and competitiveness. Green innovation and GSCM practices substantially enhance FPR, encouraging organizations to embrace such practices. GSCM practices are incorporating product recovery, restoration, and destruction. GSCM is an evolution of SCM [14]. As competition intensified in the 1990s, corporations’ supply chains became more morally and socially responsible due to an increasing consciousness of green practices. Beginning in 1995, GSCM has drawn great academic interest; in 2010, GSCM got the most attention [15]. With such practices in mind, firms create environmental management plans in response to changing environmental standards and their effects on FPR [16].

Recently, most of the studies have concentrated on revealing the link within the following domains: According to previous research, FPR is explained by corporate culture, employee engagement, and workers’ psychological qualities [17]. Nevertheless, we advocate that GHRM practices which keep hold of processes and systems to affect workers in an organized way on a larger scale [18] may improve FPR, particularly in societies like China that are considerably large on energy consumption and in manufacturing [19]. Several scholars brought attention to the topic by elaborating on the influence of GHRM practices (green participation and learning, green productivity and recruitment, and remuneration) on effective FPR [20]. Based on the aforementioned research gaps, this study highlighted the impact of GHRM, GSCM practices, and environmental strategy (ENS) on FPR [21]. Yet, limited studies examine how companies transform their ENS into competitiveness and uncover the essential resources necessary to increase FPR. GHRM, or intangible assets, are more significant than physical assets [9]. Consequently, this study demonstrates that GHRM helps businesses to increase their FPR using GSCM practices.

The main study’s contributions are stated as follows: Contrary to previous research, this research highlights a literature gap by highlighting the factors which may affect FPR. Based on authors’ knowledge, this is the first research conducted in the Chinese context. First, from the standpoint of GHRM, HR applications may assist industry-wide actions. Second, GHRM is associated with

human resources and suitable ENS, increasing GSCM practices in this industry. Thirdly, the HRM of industries with environmental challenges significantly influences the implementation of environmental management activities, finally leading to GSCM practices. The ability-motivation-opportunity (AMO) theory has been utilized in this study. However, when examining FPR, the scholars considerate little to GSCM and ENS. This study aims to fill up these research gaps. This study adds to and extends earlier research [22] by suggesting that GHRM has no direct impact on FPR. We hypothesize that GHRM indirectly impacts FPR via GSCM practices since GSCM practices are act as a mediator in this relationship. Moreover, we hypothesize that ENS moderates the impact of GSCM practices on FPR.

The remaining portions of this examination are as regards: The literature review and development of hypotheses are discussed in the Section 2. The methodology and research framework are presented in Section 3. The findings and analysis are reported in Section 4. Section 5 explores the policy implications, their limitations, and recommendations for more research.

## 2. Literature Review

GHRM refers to HRM operations that include an organization’s ecological and environmental effects. Further, GHRM incorporates a firm’s environmental management goals through its HR systems, including performance evaluation, rewards, development, and training selection and recruitment [23]. The growing integration of HRM with green principles has led to the birth of GHRM [24]. GHRM practices reflect the organizational attitude toward safeguarding the environment and include numerous HRM practices collectively centered on the unstable ecosystems and ecological repercussions of companies owing to economic activity [25]. Additionally, GHRM guarantees that workers are devoted and interested in following ecological standards while still concentrating on the profitability of their job [26]. By implementing these methods, a company may build a favorable image and assist future generations. Thus, corporate organizations must act environmentally responsible to become greener and more successful in the present business climate since they rely on achieving competitiveness [27]. The primary objective of the GHRM is to generate green human capital, which may be performed more effectively with approaches that emphasize and target human capital creation instead of reinforcing good behaviors. For instance, evaluations and incentives encourage behavior instead of constructing human capital.

Globally, there has been an increase in concern for environmental issues. Environmental protection and adopting environmentally responsible practices have risen to the top of the organization’s priorities [28]. Green purchasing, sustainable marketing, circular economy, life-cycle assessment, and overall managing the environmental effect are covered in the scholarly literature [29]. Recently, academics and practitioners have been interested in GHRM. GHRM is the collection of tactics and actions that encourage green behavior among workers to promote a more environmentally friendly and sustainable workplace and overall organization [30]. The abundance of literature evaluations on this issue is evidence of the researchers’ high regard for it.

GHRM promote the creation and ongoing operation of an environment-friendly management system, supporting a firm in reaching a higher FPR [31]. GHRM is vital to businesses’ successful expansion and greening. This is vital element of company management since, besides the apparent ecological advantages, adopting green initiatives boosts a firm’s attractiveness and contributes to retaining employees. GHRM concentrated on the

influence of particular practices on the FPR instead of a collection of practices [32]. Fang et al. [33] highlighted that jointly implementing GHRM techniques may benefit FPR. The AMO theory can discriminate against organizations' human resource use. This is supposed to alter an FPR and enhance it [34]. Therefore, organizations may sustainably improve their FPR by knowing GHRM [35]. Consequently, we hypothesize that:

**H1:** GHRM significantly influence FPR.

GHRM has evolved during the last three decades. Employees choose environmentally conscientious companies, indicating that firms are trying to attract and hire the finest people to emphasize environmental preservation and role improvement [36]. The rising effect of GHRM is shown in enterprises' recruiting and selection procedures. Moreover, as the demand for ecological preservation increases, GHRM's influence on enterprises' sustainability learning, administration, and career development is growing [37]. GHRM is favorably correlated with GSCM practices. Consequently, GHRM can impact individual workers' environmental consciousness regarding the GSCM practices. By concentrating the focus of personal employees and corporate units on ecological sustainability, GHRM affects the achievements of personal and collective struggles to reduce a firm's harmful effect on the FPR, thereby enhancing the organization's contribution to GSCM practices and environmental recovery and restoration [38]. The AMO theory posited that HRM practices influence FPR by transforming workers into exceptional, vigorous, and exclusive resources [39].

The literature is, therefore, mainly in accord with the fact that proper deployment of GSCM practices relies predominantly on GHRM practices. Or, to be more precise, the dearth of HRM practices leads to an absence of environmentally competent, engaged employees, and the traditional organizational culture can impede the deployment of GSCM practices [40]. This study advances such experimental investigations by examining their effect on FPR. Undoubtedly, GHRM has an essential function in spreading environmental viewpoints and guidelines and in promoting the recruitment of employees who seem to be dedicated to the deployment of ecological perspectives and policies in the framework of supply chain firm advancement [41]. Based on AMO theory, a more comprehensive investigation has been conducted on the relation between GHRM-GSCM practices and FPR. In light of the preceding assertions, we hypothesized that:

**H2:** GHRM significantly associated with GSCM.

FPR refers to organizational efforts to meet and surpass social expectations concerning the natural ecosystem in a way that transcends essential compliance with regulations and laws [42]. It incorporates the environmental consequences of a firm's activities, goods, and resources in a way that conforms most closely to legal and ecological criteria [43]. Past research indicates that FPR is contingent on the efficiency of green goods, green products and processes innovation, and the advancement of products [44].

GSCM practices are connected with a company's sustainability management strategy, which boosts FPR. Moreover, GSCM practices decreases a firm's negative environmental impacts and enhances its economic and social performance via waste reduction and pricing initiatives [45]. Erstwhile literature has shown that GSCM practices should not be viewed as a firm's retrospective decision to pressure stakeholders but as continuing to expand motives and practices to enhance FPR to obtain competitiveness [46]. Other studies suggested that GSCM practices encourage

suppliers and consumers to accomplish in an increasingly desirable eco-friendly manner and to reduce their unsustainable behavior, resulting in a positive effect on the FPR of the manufacturing sector [47]. Implementing educational and monitoring programs with suppliers can aid businesses in sourcing materials for their final products that pose minimal environmental risks, thereby enhancing their FPR [716-697]. This was notably true for developing-country manufacturers. To enhance their FPR, producers are now authorizing and implementing proactive measures, such as shifting toward greener production and green management alongside GSCM [48].

For instance, an eco-design entails waste reduction, and the effective utilization of resources will result in cost reductions that positively affect the FPR. GSCM practices were also demonstrated to impact the FPR positively. For example, Maskuroh et al. [49] emphasized that adopting GSCM practices resulted in increased productivity improvement and cost reductions owing to the waste reduction in manufacturing methods. Moreover, through lessening their hazardous chemical usage, eliminating or discarding arbitrary components, and lowering the environmental impact of their goods through GSCM practices, firms may obtain numerous benefits which ultimately influence FPR. It is claimed that incorporating GSCM practices will enhance employment conditions for staff and society, where individuals can lead healthier lives. Adopting GSCM practices and less polluting manufacturing processes positively impacts the social aspects of employees and society. Underscoring this point, it is argued that firms could attain various social objectives, including consumer protection, a wide variety of businesses, and environmental protection. Using the AMO theory, we hypothesize that GSCM practices are essential management resource that a firm utilizes to enhance its FPR and garner the favor of its major stakeholders. Therefore, we hypothesized that:

**H3:** GSCM practices are significantly influencing the FPR.

Relying on its association with GSCM practices, GHRM and FPR may or may not have a significant link. These reasons might be countered through businesses that do not use GHRM effectively, denying the correlation between GHRM and FPR; only when GHRM enhances GSCM practices and GSCM practices creates breakthroughs in the knowledge that GHRM can absorb which is conceivable for GHRM to have a positive impact on FPR. Moreover, an additional component must be incorporated for mediation to comprehend the association between GHRM and enterprise FPR. In this research, the mediating variable is GSCM practices. GSCM practices may indicate a firm's capacity for competitiveness, expand the marketplace, bolster product connections, and enhance social and technological advancement [50]. By implementing GSCM practices, firms are able to considerably decrease the environmental effect claimed by other parties while maintaining or expanding their success. As a consequence, we proposed the following hypothesis:

**H4:** GSCM practices mediate the association between GHRM and the FPR significantly.

ENS indicates the perspective of managerial strategies toward ecological sustainability. ENS substantially affects the implementation of environmental management strategies, particularly in businesses facing environmental issues. ENS is essential for a firm's capacity to influence and address sustainable environmental threats rapidly. The senior managers are responsible for business assets, employees, and environmental standards [51]. The present research shows ENS

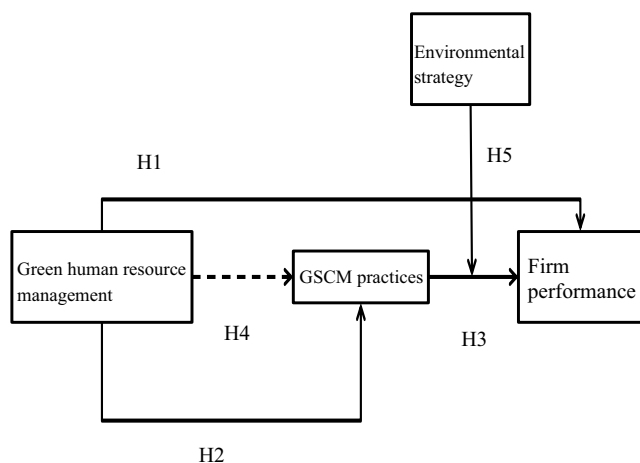
moderates the association between GSCM practices and FPR [52]. Prevention of pollution, extended producer responsibility, and sustainable growth are crucial ENS that provide business competitiveness [53]. Consequently, GSCM practices may boost the deployment of green manufacturing, eco-design, reverse logistics, and involvement of suppliers and consumers, enhancing organizational commitment to environmental issues mitigation [54]. Furthermore, implementing GSCM practices by top management may result in more effective implementation of environmental measures, enhancing the FPR [55]. In contrast, a manufacturing sector with lower ENS would disregard environmental contributing values and norms and provide fewer resources for environmental issues which affects FPR [55]. So, we proposed that:

**H5:** ENS moderates the link between GSCM practices and FPR.

### 2.1. Theoretical framework

We employed the AMO theory for investigating the GHRM-FPR linkage, which implies that workers' abilities, motivations, and opportunities contribute significantly to FPR; this integrative viewpoint demonstrates why and how decision-makers and GHRM practices encourage FPR [56]. According to this theory, GHRM help to improve the abilities of employees (e.g., via recruiting & selecting career and training development), level of motivation (i.e., incentives, reward, and pay), and opportunities (e.g., collaboration, empowering) to improved FPR [57]. Using the AMO theory as a foundation, we propose that GHRM strive to attract, motivate, incentivize, and maintain employee work attitudes towards environmental protection objectives and goals via GSCM practices for better FPR [58]. By employing this theory, GHRM assists the firms in including an encompassing infrastructure to inspire, train, encourage, and sustain green human potential for enhancing FPR through the continuous deployment of GSCM practices in procedures, goods, and services [59]. We have employed the AMO theory's theoretical perspectives to develop and suggest various hypotheses to be tested in the present work. The conceptual framework is shown in Figure 1.

**Figure 1**  
Conceptual framework



## 3. Methodology

### 3.1. Research design

This study has employed a cross-sectional study design which is of the view that the cross-sectional studies which often uses questionnaire surveys as comparatively inexpensive and quick to conduct at one point in time.

### 3.2. Participants

The poll specifically focused on middle and senior-level managers from manufacturing enterprises as the participants. This investigation was conducted from a Chinese standpoint. As an emerging market, China faces considerable environmental pressures. Because of the changing climate and emissions in the country, manufacturing enterprises must implement green policies. The targeted recipients should possess knowledge of GHRM, FPR, GSCM practices, and ENS. The data was gathered using an internet-based survey. A total of 900 online questionnaires were sent, out of which 640 were completed and considered valid. The remaining surveys were rejected due to their inadequate information. The complete demography of potential respondents is given in Table 1.

**Table 1**  
Demography of respondents

Features	Options	Frequencies	(%)
Age	20–30	200	31.25
	30–50	260	40.62
	Above 50	180	28.12
Gender	Male	374	58.43
	Female	266	41.56
Income (CNY)	<2000	49	7.65
	3000–6000	110	17.18
	7000–10,000	200	31.25
	11,000–15,000	140	21.87
	16,000–20,000	95	14.84
	>20,000	46	7.18
Education	Primary	110	17.18
	High school	165	25.78
	College degree	205	32.03
	Graduate	160	25
Experience	Less than 5 years	200	31.25
	5–10 years	190	29.68
	More than 10 years	250	39.06

**Note:** Incomplete questionnaires are discarded.

### 3.3. Instruments

In order to assess the proposed hypotheses, a questionnaire for surveys was employed for data collection. The elements for GHRM that consisted of four elements were collected from Guerri et al. [60]. The study evaluated ENS utilizing the four-item scale devised by Hussain et al. [61]. Eight elements, as described by Uddin [62], were applied to assess the practices of GSCM. The FPR was evaluated using a five-item measure developed by Bag et al. [63]. All qualities in the present study were assessed utilizing a five-point Likert scale, where a rating of 1 indicated “strongly disagree” and a rating of 5 indicated “strongly agree”. The participants were instructed to choose a scale for each item based on their firm's present status regarding GHRM, GSCM procedures, ENS, and FPR levels.

### 3.4. Data analysis

SmartPLS software version 3.2.3 is used for analysis. The expected hypotheses are evaluated by employing structural equation modeling (SEM). SEM is considered a reliable and valid tool for examining the relationship between several variables. It offers three advantages: (i) the exact evaluation of measurement uncertainty, (ii) employing empirical data for estimation of unobservable constructs, and (iii) the validation of framework is utilized to measure and execute a sequence based on adherence to data [64]. The various multivariate approaches deliberately disregard measurement mistakes. Though, SEM examines the relationships between dependent and independent variables by analyzing estimate mistakes. This technique yields exact and accurate conclusions due to its robustness and resilience [65].

## 4. Analysis and Results

### 4.1. Confirmatory factor analysis

Confirmatory factor analysis (CFA) is utilized to measure the validity and reliability of the framework. The data are well-suited for the CFA model, as shown by the chi-square value of 1.356, the standardized root mean square residual value of 0.033, and the normed fit index value of 0.974. Additionally, the model has been found to be a good fit according to Irfan et al. [66]. Hence, we acknowledge and cherish the role of each indication to the constructed variable (see to Table 2). The Cronbach alpha ( $\alpha$ ) values are deemed acceptable as they above the threshold of 0.70. Overall, the results verified the high reliability and consistency of the measurement constructs. Additionally, average variance

**Table 2**  
Factor loadings and results of reliability analysis

Variables	Items	Standard loadings	Cronbach's $\alpha$
Firm performance	FPR1	0.900	0.882
	FPR2	0.820	
	FPR3	0.821	
	FPR4	0.828	
	FPR4	0.753	
Green human resource management	GHRM1	0.837	0.876
	GHRM2	0.892	
	GHRM3	0.852	
	GHRM4	0.835	
Green supply chain management practices	GSCM1	0.819	0.890
	GSCM2	0.819	
	GSCM3	0.780	
	GSCM4	0.739	
	GSCM5	0.656	
	GSCM6	0.761	
	GSCM7	0.716	
	GSCM8	0.723	
Environmental strategy	ENS1	0.825	0.835
	ENS2	0.770	
	ENS3	0.850	
	ENS4	0.823	

extracted (AVEs) and composite reliability (CR), these are also evaluated. Previous studies have shown that the proposed standard value for CRs and AVEs is 0.50 (refer to Table 3).

**Table 3**  
Discriminant validity

Sr. #	Variables	CR	AVE	FPR	GHRM	GSCM	ENS
1	FPR	0.914	0.681	0.826			
2	GHRM	0.915	0.730	0.837	0.854		
3	GSCM	0.913	0.567	0.798	0.813	0.753	
4	ENS	0.890	0.668	0.800	0.704	0.752	0.818

Note:  $N = 640$ .

### 4.2. Common method variance

Given the cross-sectional nature of this research, it is possible that common method bias (CMB) may have occurred. This research investigated the presence of CMB by using Harman's single-factor test, specifically utilizing the major axis factoring extraction approach. As per the fundamental principles outlined by Podsakoff et al. [67], the findings are affected by CMB when one component explains more over fifty percent of the collected variation. The greatest impact of an individual component was found to be 34.50%, which falls below the 50% threshold. The results suggest the absence of any CMB in the data. In addition, we used a specific methodology to examine the CMB as described by Kock [68]. This approach indicates that a VIF value more than 3.30 indicates the existence of multicollinearity in the model [69]. However, the results of this study indicate that the VIF factor level is below the necessary threshold of 3. It has been verified that there is an absence of CMB within this study framework [70].

### 4.3. Hypotheses results and structural model

Utilizing SEM, we analyzed the model's linkages. The higher f-value of the research shows that all connections are linear [71]. The path coefficient of the constructs GHRM does not impact FPR considerably ( $\beta = 0.454, p = 0.086$ ). Thus, we rejected H1. In contrast, GHRM positively influence GSCM ( $\beta = 0.81, p = 0.000$ ), and GSCM practices significantly influence FPR ( $\beta = 0.155, p = 0.000$ ). So, H2 as well H3 are accepted. GSCM practices ( $\beta = 0.126, p\text{-value} = 0.001$ ) mediates the link between GHRM and FPR, as per results. Additionally, the moderation of ENS was examined. ENS ( $\beta = 0.040, p\text{-value} = 0.025$ ) was revealed to completely moderate the link between GSCM practices and FPR. Therefore, we accepted H5 (see Table 4).

### 4.4. Predictive relevance

The predictive validity of this study's framework is evaluated by employing the blindfold strategy to execute the test of Stone and Geisser. According to Leguina [72], a structural model has predictive relevance unless Q2 values for all endogenous constructs throughout the path model are more than zero ( $> 0$ ). All endogenous components of the framework for this research are mentioned in Table 5 and all Q2 values are larger than zero.

## 5. Discussion

This research scrutinized the contribution of GHRM practices to FPR. The study's results are summarized and analyzed under the

**Table 4**  
**Results of hypotheses**

Hypotheses	Beta	S.E.	t-value	p-value	Decision
H1: GHRM -> FPR	0.454	0.291	1.556	0.086	Not Supported
H2: GHRM -> GSCM	0.813	0.032	25.769	0.000	Supported
H3: GSCM -> FPR	0.155	0.073	2.119	0.000	Supported
H4: GHRM -> GSCM -> FPR	0.126	0.06	2.104	0.001	Supported
H5: ENS × GSCM -> FPR	0.040	0.012	3.256	0.025	Supported

**Table 5**  
**Blindfolding statistics for the general model**

Construct	SSO	SSE	Q <sup>2</sup> (= 1-SSE/SSO)
FPR	1070	503.19	0.530
GHRM	856	412.20	0.518
GSCM practices	1712	1083.21	0.367
ENS	856	325.55	0.620

research hypothesis. Our findings are similar [73] in that GHRM is not directly associated with the FPR. We explain this result in light of the suggested reinterpretation of the GHRM-GSCM connection. For instance, GHRM, while its significance, may not be directly linked to FPR. HR personnel may have excellent intentions but lack the skills and knowledge to create a good environmental effect. However, an organization actively engaged in GSCM practices will likely have a significant environmental impact. This article demonstrates that GSCM practices mediate the effect of GHRM on FPR. Furthermore, we highlighted that ENS significantly moderates GSCM practices and FPR’s relationship.

**6. Conclusion and Policy Recommendations**

Our study’s findings have significant consequences for the advancement of theory. First, our research adds to the advancement of the AMO theory [73] to comprehend and explain the reasons for GHRM, GSCM practices, and the FPR. We argue that GHRM is a strategic resource that companies should use to define and execute to implement GSCM practices and, ultimately, FPR. Consequently, our research explores the AMO theory and illustrates why and how GHRM enhance FPR through the mediation influence of GSCM practices and the moderation effect of ENS.

Secondly, although from different angles, GHRM is vital in releasing developmental capabilities. On the GHRM linkages, previous research disagrees with whether organizational leadership plays the function of antecedent [74]. The findings show that the GHRM not directly influencing on the FPR but indirectly influences the FPR by mediating GSCM practices, and ENS moderates this relationship. Moreover, we recommend that organizations implement GHRM to develop employees’ eco-friendly skills and intentions and offer them opportunities to participate in ecologic management-related operations at the workplace to boost GSCM practices and ultimately enhance FPR [75]. Thirdly, we discovered that ENS moderated the GSCM practices relationship and the FPR. As a result, we propose that GHRM, such as eco-friendly recruitment, coaching, performance appraisal, and empowering, assist firms in attracting, retaining, and sustaining green workers for GSCM implementation to maintain superior FPR [76].

This research provides numerous essential recommendations to managers and leaders on implementing GHRM and GSCM practices and leveraging it for improved FPR to outperform competitors in the

marketplace. Firstly, we propose that spending on sustainable development is advantageous for brand success in the minds of its stakeholders, who are increasingly expecting and pressuring businesses to be sustainable in all of their processes, goods, and services. According to our research findings, organizations should highlight and promote GHRM. Consequently, we propose that GHRM should make personnel with green motivation and performance feel at ease in a nurturing environment and help them find opportunities to recognize their eco-friendly prospects, thereby enabling the organization to implement GSCM practices throughout their production processes to the end life of the product to stay viable and able to compete in the marketplaces.

Thus, according to our research findings, we recommend that top management strives toward integrating the firm’s environmental stewardship objectives with GHRM practices to promote and maintain GSCM practices. Thirdly, our research indicates that firms’ FPR is contingent upon the GSCM. Moreover, our research suggests that organizational managers and leaders should see GSCM as a strategic asset and use it to achieve FPR objectives. Consequently, our study provides several managerial implications for attaining and maintaining improved FPR via GHRM, GSCM practices, and ENS. Firms must exert continuous effort to revitalize and enhance their GHRM. A corporation can only obtain competitiveness when its GHRM results in successful FPR via GSCM. In this way, GHRM is an implicit tool and dynamical capacity that continuously evolves in response to GSCM practices.

Despite its essential contributions, the present study revealed several significant limitations. Initially, in this study, ENS was a moderator between GSCM practices and FPR. Thus, future research should incorporate two more moderators: green organizational culture. Secondly, management techniques differ between companies, sectors, and countries. Consequently, GHRM differ among countries, sectors, businesses, and developed economies. So, the generalizability of the results is restricted, as the research was confined to the manufacturing business in a particular country (China). Thirdly, the study examined the function of GSCM practices as a mediator between GHRM and FPR. Therefore, future research should investigate the mediating influence of psychological green culture, which would substantially contribute to the GHRM and FPR.

The finding revealed that the lack of training for both teachers and students was the main factor that prevented them from using educational technology tools in teaching and learning Ecology. Therefore, training on educational technology for both teachers and students is recommended. Since educational technology tools have arisen excitement and curiosity among students, they recommended other module tutors to use educational technology tools as well. Educational technology tools integrated in the module will be further replicated by student’s teacher during teaching practice or as a full fledge teacher. Therefore, tutors were recommended to use variety of educational technology tools in learning, teaching and an assessment.

## Ethical Statement

This study does not contain any studies with human or animal subjects performed by any of the authors.

## Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

## Data Availability Statement

The data that support this work are available upon reasonable request to the corresponding author.

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