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Fostering Environmental Performance Via Green Human Resource Management, Green Transformational Leadership, and Green Innovation in the Construction Industry of Pakistan

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Abstract

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Keywords: GHRM, Green Innovation, Green Transformational Leadership, Environmental Performance, Smart PLS-SEM

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Through green innovation, green transformational leadership, and green human resource management, this study assesses sustainable business performance in Pakistan's construction sector. Data was collected from ten small and medium-sized manufacturing companies through a questionnaire. To analyze the data, we used partial least squares for structural equation modeling. According to the study's findings, sustainable business performance is significantly impacted by GHRM. The link between sustainable corporate performance and HRM practices is mediated by green innovation. The relationship between GHRM and sustainable company performance is mediated by green dynamic capacity. The results also showed association between green innovation and sustainable company performance is strengthened when green transformational leadership is moderated. GHRM and green dynamic potential are strengthened when transformational leadership is moderated. For managers and directors in Pakistan's construction sector, the study provides innovative methods. Green innovation, green dynamic capacity, and GHRM enable managers to enhance their sustainable company performance.

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Introduction

In the contemporary business landscape, sustainable firm performance (SFP) has emerged as a cornerstone of long-term success and resilience. This paradigm shift towards sustainability is particularly relevant to sectors like construction that have large environmental impacts. Although the construction sector plays a significant role in the expansion of the world economy, it is also to blame for environmental

problems such as waste production, greenhouse gas emissions, and resource depletion. Thus, integrating sustainability into the core strategies of construction firms is an environmental imperative and a competitive advantage. It is particularly relevant in developing nations like Pakistan, where the construction industry plays a vital function in the nation's economic growth but faces sustainability and environmental management challenges.



Green Human Resource Management (GHRM) is a critical lever for enhancing SFP. GHRM integrates environmental management goals with human resource guidelines, practices, and functions for promoting sustainable development. It involves recruiting, developing, and retaining employees firmly committed to environmental values and encouraging an organizational culture that prioritizes sustainability. By encouraging a sustainable culture, GHRM promotes the adoption of green ideas and practices throughout an organization. Despite the growing acknowledgment of its importance, the mechanisms through which GHRM facilitates sustainable performance (the ability to achieve financial, social, and environmental objectives) are not fully understood. This gap is particularly pronounced when examining green innovation and dynamic potentials.

Green innovation is pivotal in achieving sustainable performance, enabling firms to proactively respond to environmental principles, reduce costs as well and tap into new market opportunities. However, the process by which GHRM practices encourage green innovation within organizations is complex and multifaceted. It involves creating a work environment supporting creativity as well as risk-taking, providing training and development opportunities focused on sustainability and aligning functioning management practices with environmental aims. The link between GHRM and sustainable performance is often treated as direct in the literature that currently exists, with little emphasis placed on the critical role of green innovation as a mediator. GHRM can significantly enhance an organization's capability of renovating in ways that contribute to environmental goals as well as a competitive advantage by adopting values and rewards sustainability-oriented improvement culture.

Similarly, green dynamic capabilities, encompassing the capacity to renew, change, and innovate against conservational issues as well as prospects, are crucial in improving SFP. Green dynamic capabilities include sensing and shaping environmental trends, seizing sustainable opportunities, and transforming the organization in alignment with green strategies. GHRM influences the development as well as application of green dynamic capabilities is yet to be explored. It involves examining how GHRM practices can equip employees with the services and motivation for engaging in sustainable performance, facilitate the reconfiguration of resources for environmental innovation, and support the organizational change

necessary for embedding sustainability into strategic processes.

Furthermore, transformational leadership's function in moderating the relationship between GHRM performances and sustainable outcomes warrants deeper investigation. Transformational leaders can inspire, motivate, and foster an environment conducive to change, and are potentially pivotal in embedding sustainability into the fabric of an organization. This aspect is especially crucial in Pakistan's construction industry, where leadership styles significantly impact organizational culture and innovation. To close these gaps, this study looks at how GHRM contributes to SFP in Pakistan's construction industry, specifically focusing on the green innovation roles and green dynamic capabilities as mediators and transformational leadership roles as moderators. It contributes to theoretical advancements in GHRM and sustainability and offers rational perceptions for managers and policymakers directing to foster a sustainable construction industry in Pakistan and developing countries.

Practically, firms in the construction sector should emphasize identifying and scaling local innovations that offer sustainable solutions. It might involve using locally sourced materials, traditional, inherently sustainable construction techniques, or new technologies that reduce the carbon footprint of construction projects. Construction firms should proactively seek opportunities to lead in sustainability, adopt continuous learning and adaptation, collaborate with environmental experts and organizations, and invest in technologies that enable efficient resource use. Specifically, Pakistani construction firms might focus on developing capabilities in sustainable urban planning and infrastructure development to address the problem of quick urbanization and climatic alternation. Thus, addressing these aspects can significantly contribute to the construction industry's environmental sustainability in developing nations, offering a model to integrate economic development with ecological preservation.

The GHRM practices towards enhancing SFP in an organization are becoming very important nowadays (Chowdhury et al., [2023](#)). The practices that are built towards green behavior and values amongst the employees to increase sustainable performance are called GHRM practices (Aboramadan, [2020](#)). GHRM includes the inclusion of environmentalism in an organization along with recruitment and selection, training, reward, appraisal, and green behavior (Bilderback, [2023](#)). GHRM practices include green

skills for employee onboarding, training and development, and performance management for staff members who should continue to be fully involved in improving sustainable performance through a variety of green practices like pro-environmental behavior, performance management, and rewards (Agyabeng-Mensah et al., [2020](#); Maitlo et al., [2022](#)).

Maintaining, and creating internal abilities and related competencies affect the environmental management system in an organization. Green transformational leadership (GTL) is a phenomenon that significantly forecasts firms because of a lack of awareness among employees about practicing environmental sustainability (ES) (Sun et al., [2022](#)). GHRM and transformational leadership are essential in enhancing organizational abilities, internal competencies, resources, and capabilities in the construction industry by various methods and approaches. Existing studies explored green dynamic capability (GDC) to influence SFP (Sun et al., [2022](#)). Another study explored the green behavior's influence on environmental performance. In the present research, we will explore the GTL impact on SFP, mediating green innovation and moderating the role of GTL (Ullah et al., [2022](#)). The relationship of leaders with their employees is about understanding and directing them well with interpersonal skills so that employees can cooperate and understand the requirements of the organization (Priyadarshini et al., [2023](#)).

Green innovation is a combination of product and process innovation. It includes increasing the product design, manufacturing processes responsible for the production of a product, and other manufacturing strategies that can reduce pollution during companies' manufacturing and production operations (Ogbeibu et al., [2019](#)). Pastries explore green innovation and other dynamic capability concepts such as green dynamic capability, sustainable innovation, economic innovation, and environmental innovation. According to previous studies, green innovation increases SFP (Sánchez-García et al., [2023](#)). However, there is no clarity as to how green innovation enhances sustainable form performance through the GDC mediator and GTL moderator. The concept of green innovation has been explored by many researchers but without exploring the moderation and mediation of GDC and GTL.

As per this study, the top management of an organization should practice GHRM and focus on GTL practices to enhance internal competency, which is sustainable and attentional to green innovation and GDC (Mohaghegh et al., [2021](#)). We want to respond to two important queries: What impact does GHRM have

on SFP? Does the influence of GHR and practices on sustainability from performance depend on GTL? Is the link between green and sustainability and appeal mediated by green dynamic ability? Ability motivation opportunity and resource-based perspective theories were used in our investigation. The outcome significantly provides additional knowledge about legitimate material already available on GHRM and SFP in relation to Pakistan's construction sector. Resource-based view theory is related to ES and GHRM practices because it creates an environment of competitiveness through internal resources which are immovable and inimitable (Khanra et al., [2021](#)) Green innovation and GTL can be better understood by applying ability motivation and opportunity theory, which includes the impact of innovation and dynamism in an organization (Yu et al., [2019](#)). Turley, we provide empirical evidence for the necessity of green archers and practices for SFP in the construction industry or Pakistan.

Ability Motivation Opportunity Theory

It proposes that increasing employee engagement and providing them with various methodical and excellent opportunities for their involvement develop a firm's capability to enhance employees' performance (Yu et al., [2019](#)). Hence, G HRM improves green performance, and it can provide excellent green training recruitment selection rewards and compensation with a view to enhancing green behavior and green intellectual creativity among the employees (Rizvi & Garg, [2020](#)). Previous research has shown that GHRM has a positive influence on an organization's environmental performance, with GHRM attributes significantly improving environmental performance mostly because of green behavior adoption by workers (Prajogo, [2015](#)). Furthermore, GDC and green innovation also inculcate thinking out-of-the-box quality and give an opportunity for transformational leadership to enhance SFP (Zain et al., [2023a](#)). Transformational leadership enhances the ability and knowledge of an employee to transform their behavior into green behavior and enhance environmental and sustainable performance (Akdere & Egan, [2020](#)). A firm ability to transform immediately and adapt to fluctuations in global warming and climatic fluctuation is the ability to innovate and present some dynamism in an organization where employees can adapt to the changes in ES. Hence, green dynamism, green innovation, and green intellectual capital become pronounced and more important for the employees to enhance ES in the wake of recent threats presented by global warming and climate change.

Hypothesis Development:

GHRM and SFP

GHRM essentially incorporates the skills of innovation and productivity among the employees in implementing ES changes (Al-Shammari et al., 2022). Existing research revealed that environmental strategies are more synchronized with innovation dynamism to enhance business performance. Further research is required to confirm whether this dynamism and innovation, along with transformational leadership, enhance SFP or not (Do, Budhwar, & Patel, 2018). It is also necessary to research whether this transformational leadership has a profound and significant influence on employees' green behavior for SFP improvement.

For achieving SFP, the company strategies are pronounced right from the induction and training of green employees (Veerasingam et al., 2023). Geo channel RM practices have a pronounced effect on various green practices (training, reward, selection and recruitment, and compensation), along with green intellectual capital. These HRM practices have a pronounced effect in enhancing the SFP to achieve the results (Appiah et al., 2023). Many studies have revealed that employing and induction of good GHRM applies have a pronounced influence on environmental performance. Instead, they increase environmental performance in an organization with good green initiatives and good green compensations for the employee's encouragement (Hameed et al., 2020).

Researchers have explored that various programs related to training and development also focus on enhancing the employee's skill, knowledge, and ability at the workplace, thus enhancing the performance and adopting green behavior for a contribution towards SFP (Carballo-Penela, Ruzo-Sanmartín, Álvarez-González, & Paillé, 2023). A thorough and redundant green performance appraisal also evaluates employees to foresee their contribution towards ES (Al et al., 2022). Green performance management has been utilized by many firms to improve the efficiency of employees lacking green behavior. Prior to the search, it was also revealed that good initiatives like green compensation also encourage employees to participate in ES programs. Green compensation has been adopted by many firms to improve SFP, which ultimately contributes to increasing competitive advantage among various competitors (Yousuf et al., 2021).

In organizations, GHRM practices adoption creates a capability that enables them to innovate and achieve dynamism for managers for transforming

them into green organizations (Ahmed et al., 2022), providing a boost to transformational leadership to achieve SFP. Research also revealed that without adopting transformation and agility in an organization, it is challenging for an organization to adopt green behavior in the wake of climate change and global warming (Darvishmotevali & Altinay, 2021). With the view to adopt green compensation and green reward, firms are looking to benefit the employees with low salaries and give them an opportunity to enhance their skill, knowledge, and ability, boost their abilities more, and give a sense of competition among other employees in an organization (Faisal, 2023). Research has also revealed that green selection and recruitment also play a critical function in employees who have green behavior. In the wake of global warming, it has become imperative to induct employees with an inclination towards ES and adopt green behavior as quickly as possible. Due to specific climate changes, global warming, and the emissions of carbon in the environment, it has become a challenge for the community and the world to adopt ES as soon as possible (Nguyen et al., Do, & Paudel, 2023). Henceforth, the following hypothesis was proposed:

H1: GHRM practices are significantly and positively related to sustainable firm performance.

Relationship between GHRM and GDC

GHRM and GDC have become pronounced as well as significant because firms could not adopt the required dynamism for achieving SFP (Ullah et al., 2022). Firms that quickly adopt dynamism and transformational ability in ES often attract customers and achieve competitive advantage (Correia et al., 2023). In the wake of global warming, customers, competitors, and investors are all very concerned about climatic alternation and ES concerns (Allal-Chérif et al., 2023). All stakeholders have focused on the need to achieve green practices in an organization. Organizations are working to adopt such green changes, but without dynamism and innovation, they are finding it hard to sustain and transform them to adopt environmentally sustainable practices. GHRM practices, once fully adopted and practiced in an organization, make a dynamic capability for ultimately Bringing a culture of innovation and transformation to an organization (Mehralian et al., 2022).

GDC essentially increases environmental and SFP (Liboni et al., 2022). Existing research revealed that GDC instills innovation and a culture of dynamism in an organization to increase the firm's competitive advantage. Recent research has also revealed that GDC has a significant link with green innovation and

GTL. GDC is still a culture of innovation in an organization. It is contingent upon transformational leadership to bring a culture of innovation, dynamism, and creativity to an organization to practice screen behavior and related strategies (Wamalwa, 2022). Many firms are looking towards increasing GDC in an organization because of the requirement of adaptability to change in an organization for SFP.

For responding to environmental and climate change challenges, firms are looking for adaptation and innovation to encourage employees and bring them to a level where SFP can significantly contribute towards competitive advantage and, ultimately, the growth of an organization (Q. et al., 2020). GDC is relevant to beneficial practices in and outside of an organization where ES requires more focus and effort. It is also observed that firms that do not adapt themselves to dynamism and innovation often do not adopt a green environmental culture and green innovative behavior of employees, thereby minimizing the effect of ES (Aftab et al., 2022). Recent studies have revealed that due to the challenging transformational world where innovation and dynamism have increased in various sectors like technology, spacecraft, automobiles, and energy conversion, SFP is also contingent upon innovation and dynamism. Hence, GHRM is seen as significantly related to GDC (Niazi et al., 2023). Employees having GDC often follow GHRM practices under transformational leadership and strategic flexibility for increasing environmental performance (Niazi et al., 2023).

Existing studies reveal that practicing GRM also increases the scale knowledge and ability of employees in an organization, thereby making a capability that can increase sustainability from performance (Alshura et al., 2023). To adopt green creativity, organizations practicing GHRM often look towards dynamism and innovation in management and employees as well (Niazi et al., 2023). Pause studies her veiled that organizations that could not adopt dynamism and innovation in GHRM practices could not offer a better solution towards ES and are behind (Shahzad et al., 2023). Therefore, it is hypothesized that:

H2: GHRM practices are significantly related to sustainable firm performance.

GDC as a Mediating Mechanism

GDC is an organization's capability to explore its existing skill knowledge and ability along with tangible resources to revamp, radio, and build its green organizational abilities to transform itself according to the innovative and dynamic environment

in the market (Ogutu et al., 2023). GDC is originally based on the concept of dynamism and innovative capabilities, where an organization explores resources various skill knowledge, and ability-related competencies to develop green abilities in a changing environment (Do, Budhwar, & Patel, 2018). Notably, green capabilities assist various organizations in collecting, integrating, and exploring various new external resources with the resources present in an organization to make an ultimate green product to protect a sustainable environment (Hao et al., 2023). It is tough for an organization to achieve green sustainability and remain competitive without green dynamism and innovation adoption (Mazon et al., 2022).

Existing studies have revealed that GDC allows organizations to adapt to various practices to achieve pro-environmental solutions to ecological problems differently (Sarwar et al., 2022). Hence, dynamic capabilities are fully integrated into an organization; therefore, it is difficult for the firms to remain fixed on existing capabilities and continue without bringing any positive change to an organization (Sahebalzamani et al., 2022). When firms encounter a constantly transforming environment, current reserves as well as various abilities may become less effective and may not maintain a company position in an environment of competitiveness, dynamism, and customer value. Hence, it is continued upon the firms to adapt to various essential needs of a business to become relevant in an environment and achieve competitive advantage. Therefore, many studies have revealed that GDC becomes an essential precondition for dynamism and innovation for ES in the construction industry of less developed countries, especially Pakistan (Yi & Demirel, 2023).

Pause experiments have revealed that transformational leadership has an important function in enhancing an organization's dynamic capabilities. Construction firms where top leadership looks for dynamism and innovation also explore the importance of transformational leadership integration with GDC (Pham et al., 2022) The GDC mediator role between green innovation and transformational leadership has been researched by a study. However, its mediation between GHRM practices and green innovation is a less researched area (Özgül & Zehir, 2023). Existing research revealed the mediating role of GDC between GHRM practices and green innovation. This research is contingent upon the concept that GHRM practices become a specific capability in an organization for ultimately bringing innovation and dynamism culture to an association. This culture of innovation and dynamism, once

adopted in our organization under the competent and transforming leadership in ES, becomes an essential aspect of increasing SFP. Therefore, a hypothesis was proposed as:

H3: Green dynamic capability mediates the relationship of GHRM and Sustainable Firm Performance.

GRL as Moderator

GTL is a style of leadership where leaders express their desire to change and direct employees through their innovation, inspiration, and direction to complete a vision (Pham et al., 2022). Various studies have concluded that GTL has a critical role in enhancing the perception and performance of employees. GTL has various critical dimensions like individualized consideration, inspirational motivation, charisma, and intellectual stimulation (R. et al., 2023). With the help of these four dimensions, Cheng and Cheng 2013 explained that GTL is a very dynamic and innovative leadership style that gives a clear vision, mission strategy, and required motivation to employees and fulfill their needs of development and accomplishment of sustainability objectives in an organization (Priyadarshini et al., 2023).

Followers of GTL have given dynamic and innovative results in practicing sustainability in an organization. Various studies have explored the relationship of GTL with other constructs like perceived organizational support, green intellectual capital, green creativity, supervisor support, and related aspects (Ghosh & Haque, 2022). Hence, the relationship of green transformation with GDC and green innovation needs to be explored more to achieve SFP in an organization. This study explored the moderating role of transformational leadership and whether it has an effect on GDC and green innovation in enhancing the SFP or otherwise. GTL also builds trust and confidence in followers to achieve green knowledge, skills, and abilities and also gives recognition to their contribution to ES (Odugbesan et al., 2022). Ability motivation and opportunity theory provide A theoretical foundation to understand the integration effects of GHRM and transformational leadership on GDC and green innovation.

In this context, GTL provides employees with a clear vision, mission, and strategy to inspire and develop them to achieve organizational objectives and ultimately enhance SFP (Zain et al., 2023b). Researchers suggested that leadership is an essential contextual aspect in the workplace. Our employees can be inspired by a clear vision, mission, and

objective for ultimately adopting green behavior and green outcomes (Sun et al., 2022). In addition to this, GTL also established a very high-quality linkage with the employees by practicing green compensation, giving them trust and required support for ultimately enhancing ES, thus achieving sustainable goals (Ullah et al., 2022). Therefore, we argue that the interactive effects of GHRM and practices and GTL may strengthen the positive relationship between GHRM practices and green dynamic capability.

Transformational leadership creates a culture of dynamism in an organization (Li et al., 2020). It gives a clear vision, mission, and objectives in an organization for bringing positive change and growth. The necessity of change brings fresh strategies to an organization, reducing resistance to change (Oreg, 2003). Organizations that do not follow a culture of change often lose customer value and recognition. Transformational leadership enhances the required trust and commitment in an organization, thereby bringing a concept of green innovation to an organization. Many studies have discovered the component of GTL, which is intellectually inspired (Reclusado, n.d.). GHRM practices have become an important capability that brings green innovation to an organization. GTL plays a significant role in motivating employees or other people in an organization by enhancing the need to do more than what is required (Rizvi & Garg, 2020). Leaders with green transformational ability also motivate and inspire their employees to act as per the vision given to them and bring a culture of innovativeness and dynamism to an organization (Mohaghegh et al., 2021). A leader who creates an impact on green behavior or approaches related to green skin knowledge and ability brings more innovation and adaptability to an organization. Hence, green transformational leaders bring change and promote green innovation and dynamism in an organization. Therefore, our study suggests that GTL might positively assist or positively affect the utilization of GRM practices to enhance green innovation (Jia et al., 2018).

H4a: The positive relationship between GHM practices and green dynamic capability is moderated by green transformational leadership.

H4b: The positive relationship between GHM practices and Green Innovation is moderated by green transformational leadership.

Mediating Role of GDC

Effects of environmental changes like global warming, climate change, and the emission of carbon have

created much damage to ES (Hansen et al., 2013). This effect on ES has posed a severe challenge and influenced the industry to foresee and adapt my years for reducing the environmental impact on various operational activities and production activities in the organization (Khan et al., 2022). In this era of competitiveness and revenue generation, these effects on the marketplace make it turbulent and also create much impact on companies' business and revenue generation, besides other important aspects like customer value, customer needs, and customer loyalty. As a consequence, organizational resources, various standard operating procedures, and aspects related to effectiveness and efficiency are significant in addressing such environmental challenges (Khan et al., 2022).

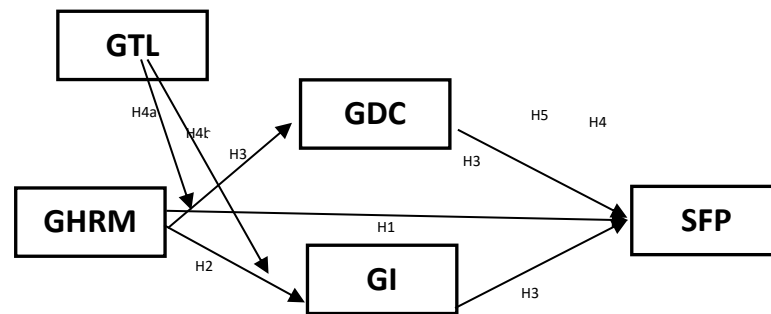
Because these challenges force and transform an organization to bring a culture of dynamism and innovation in an organization to bring ES to the organization (Abbas & Khan, 2022). Due to the scarcity of resources, assets owned by organizations may not be sufficient to bring innovation, dynamism, various strategies, and related skills (Rojas-Córdova et al., 2022). Thus, organizations have to transform their

strategies, standard operating procedures, and various policies to adopt A culture of ES within the span of limited resources. This necessitates out-of-the-box solutions with immense use of innovation, creativity, and dynamism, along with other factors like motivation and the green behavior of employees in an organization (Alyahya et al., 2023).

Previous studies have explored the use of green innovation as a mediator with financial performance and financial resources, capability management, and corporate sustainable development (Waqas & Tan, 2022). Thus, based on RBV theory and AMO theory, we further investigate the mediating role of green innovation in GHRM and SFP (Awan et al., 2022). Past studies have explored this relationship where GHRM has been mediated by green innovation having an impact on the environmental performance, social performance, and financial performance of an organization. Hence, the following hypothesis is suggested (Zhou et al., 2023).

H6: Green Innovation mediates the relationship between GHRM practices and sustainable firm performance.

Figure 1



Research Methodology

The study used a survey method; data was collected using a questionnaire from small and medium construction companies located in Pakistan. The reason for surveying Pakistan's construction industry is that stakeholders in this industry create a significant impact on ES in the context of Pakistan's construction industry. Furthermore, the construction industry is a primary source of employment and provides these jobs to the employees in Pakistan. Thirdly, this understory creates a significant impact on monumental sustainability in Pakistan in terms of the construction of roads, city infrastructure, new societies, and the building of various construction sites, which affects the cultivated land in Pakistan's urban areas. A convenient sampling approach was employed in Kothari 2004. To collect data from the construction industry's small and medium firms, 520

questionnaires will be distributed to hire management project directors and senior managers in an open organization. Considerable questionnaires have been given to the contractors and on-site managers, which ensure the practices of ES and also retain the knowledge of green services and green behavior. During the scrutiny of the questionnaire, we found some items blank, and some correspondence did not fill in completely. One hundred twenty questionnaires were not included because of their inaccuracy and incomplete responses.

Measure

The study adopted measurement scales used earlier in research studies. For this purpose, a six-item scale of GHRM was adopted by Dumont et al. (2017). A seven-item scale was adapted to measure green dynamic capabilities (Pavlou & El Sawy, 2011). For

measuring Green Innovation, an 8-item scale was adopted (Chen et al., 2006). Fifteen items were adapted to measure SFP (Paulraj, 2011). A six-item scale of GTL was adopted (Podsakoff et al.1996). All variables were measured using a 5-point Likert scale

ranging from 1 = strongly disagree to 5 = strongly agree.

Response Rate and Demographic Data

The summary of demographic data is presented in Table 1.

Table 1

Demographic results from a survey.

Demographic	Item	Frequency	Percent
Gender	Male	288	72
	Female	112	28
Education	Bachelor Degree	88	22
	Master Degree	98	24.5
	MS/MPhil Degree	184	46
	PhD Degree	30	7.5
Experience	< 3 Year	161	40.25
	3 to 5 Years	90	22.5
	5 to 10 Years	81	20.25
	10 to 15 Years	19	4.75
	> 15 Years	57	14.25
Management	Senior Managers	74	18.5
	Mid Managers	176	44
	Lower Managers	150	37.5

Results

To evaluate the internal and external consistency of the sample data gathered using the research tool, we performed validity and reliability assessments. The reliability and validity of the research measures were assessed using Cronbach's alpha, average variance extracted (AVE), and composite reliability (CR). Table 2 and Figure 1 demonstrate that, according to the

threshold criterion, each factor loading is larger than 0.70 and significant (Hair et al. 2017). Their composite dependability scores varied from 0.79 to 0.90, while their alpha values ranged from 0.78 to 0.91. These results are above the 0.50 criterion, suggesting the convergent validity of the research instruments and the excellent reliability of the measures utilized (Fornell & Larcker, 1981).

Table 2

Cronbach's alpha, composite reliability, and average variance extracted

Variables	No. of items	Alpha	CR	AVE
GHRM	10	0.89	0.91	0.62
GTL	6	0.90	0.92	0.55
GDC	8	0.91	0.92	0.71
SFP	6	0.94	0.94	0.55

Table 3

Summary of correlation analysis.

Variables	M	SD	1	2	3	4
GHRM	3.80	.58	1			
GDC	3.57	.66	.166**	1		
SF	3.52	.88	.027	-.082	1	
SFP	3.83	.67	.324**	.268**	.108*	1

Note: * $p < 0.05$, ** $p < 0.01$;

The range of the mean values was 3.83 for the highest and 3.52 for the lowest. The maximum conformance was shown by the SFP findings (Mean = 3.83, Standard Deviation = 0.67). With a mean of 3.52 and a standard deviation of 0.88, SF is the lowest indicator. Covariance and the link between two continuous

variables were measured using Pearson's Correlation. Using SFP, the correlation value between SF, GDC, and GHRM practices was calculated. The findings show a strong positive correlation between the firm's success and GHRM practices, GDC, and SF. The p-value for each finding is less than 0.01.

Table 4
Testing of Hypothesis

	Original Sample (O)	Sample mean (M)	Standard Deviation (STDEV)	T	P values
GHRM -> SFP	0.306	0.313	0.055	5.568	0.000
GHRM -> GDC	0.187	0.193	0.061	3.050	0.002
GHRM->GDC>SFP	0.040	0.041	0.019	2.097	0.036
GDC -> SFP	0.211	0.214	0.066	3.182	0.001
SF -> SFP	0.152	0.166	0.061	2.500	0.012
SF x GDC->SFP	-0.161	-0.161	0.079	2.034	0.042
SF x GHRM-> SFP	0.179	0.161	0.082	2.184	0.029

Note: * $p < 0.05$, ** $p < 0.01$;

Cronbach's alpha was calculated to assess reliability in addition to validity, ensuring that reliability is much higher than the 0.70 threshold for all research variables. As a result, a reliability test was conducted on every item. All of the variables' Cronbach's alpha values were higher than 0.80, indicating remarkable internal consistency across the items—with the exception of big data adoption, which had a value of 0.76. Table 2 displays the summary of the reliability and validity assessments.

Regression analysis was used to assess the research hypothesis (Anderson et al., 2011). "The effect of an independent variable varies on the dependent variable varies across levels of the moderating variable" (Williams, 2011) is the definition of moderation. The impact of moderation is estimated by the regression coefficient of the interaction term (Hair et al., 2018).

Testing of Hypotheses

The suggested theories were examined using the structural equation modeling method. With $b = 0.313$ and $p\text{-values} = 0.000$, GHRM significantly and favorably affects SFP, supporting the hypothesis that GHRM is a major predictor of SFP. Additionally, GHRM's effect on sustainable GDC was examined; $b=0.187$ and $p\text{-values}=0.002$ indicated a significant and favorable association. Thus, H2 is accepted, which indicates that GHRM is a significant predictor of GDC. The impact of GDC on SFP was analyzed and resulted in the acceptance of H3; that is, GDC is significantly and positively related to SFP having

$b=0.214$ and $p\text{-values}=0.001$. During the mediation analysis, GDC (as mediator) mediates the relationship between GHRM and SFP ($b=0.041$ and $p\text{ values}=0.036$). The moderation results show that SF moderates the relationship between GHRM and SFP ($b=0.179$, $p\text{-value}=0.029$); hence, H4 is accepted. The moderation effect of SF was also investigated, which shows that SF moderates the relationship between GDC and SFP ($b=-0.161$, $P\text{-value}=0.042$); hence H5 is supported. Results are shown in Table 4.

Theoretical Implications

The study's conclusions have a number of important theoretical ramifications. First off, our research expands on the ability motivation opportunity AMO hypothesis by examining how GTL affects the connection between GHRN and green dynamic capacity. Second, using GTL's moderating effect (which is also an extension or addition to the ability motivation theory) the research investigated the connection between GHRM and green innovation. Thirdly, by examining the way in which GTL influences green innovation and GDC, this research investigated GDC and contributed this significant feature to the existing legislation. According to the view of green dynamic capability, organizational performance is contingent on its ability to integrate and effectively utilize the resources that are required. Hence, in the wake of significant challenges faced by leadership, there is a dire need to acquire and improve the dynamic and innovative capabilities and resources in Pakistan's construction industry. This study contributes to developing and exploring the link

between GTL and SFP. Funding of these studies will attribute and contribute towards GTL literature and its impact on green innovation and green dynamic capability, which ultimately increase SFP. This study also extends the resource-based view theory by exploring the link between GHR and SFP through green innovation and green dynamic capability. Organizations utilizing their resources should not be inevitable and should be used with great innovation, creativity, and dynamism.

Practical Implications

This study has important practical ramifications for the leaders and managers of Pakistan's construction sector. First, our research indicates that managers of small and medium-sized construction companies should understand the critical role that green transformational leadership, green dynamic capability, and green innovation play in boosting SFP. Second, this research also shows that any organization that wants to get the necessary competitive advantage and economic sustainability in addition to ES must practice green transformational leadership to improve green innovation and GDC. Transformational leadership style, once integrated into an organization along with innovation and dynamism, enhances sustainability performance and also increases adaptability in an organization. Leaders of large construction industrial organizations need to achieve the required GDC and transformational leadership to increase a culture of green innovation and practically utilize the limited resources for practical ES. Firms should integrate dynamic capability and innovation because it effectively mediates the relationship between GHR and sustainability from performance. Our study also suggests that green transformational leadership in the construction industry constantly monitors the environment internally and externally, quickly responds to any changing environment, and remains competitive with other organizations. The leaders in the construction industry should be effectively trained to practice HRM, and they should also monitor the external and internal environment with reference to the standard operation police procedures policies and rapidly adapt to the changes for ultimately increasing SFP through green innovation and green dynamic capability.

Conclusion

Sustainable firm performance is an essential phenomenon to face the challenges in the wake of global warming and climate change. President research gives better insight as to how HRM practices should influence sustainable firm performance while integrating the effect of green innovation, green dynamic capability, and green transformational leadership. Hence, GHRM practices are essential to enhance sustainable firm performance. However, firms need to integrate various innovative strategies to adopt such policies, which could enhance the motivation and creativity among employees to adopt green behavior. Furthermore, the culture of innovation and dynamism amongst employees also encourages them to perform better once they are recognized and they are given some good rewards and compensation for ultimately enhancing sustainable firm performance.

Limitations and Future Research Direction

The limitations of the current study will also help future scholars expand their research in this area. First off, this study was carried out using data from Pakistan's construction sector; further research needs to look at other sectors where IT is integrated, such as manufacturing companies and hospital marketing enterprises. It's possible that the results of this research won't apply to other organizational studies and other sectors. To improve sustainable performance, future research should search for more elements and precursors of green innovation and green dynamic capacity. However, we collected data from managers and employees in an organization, which reduced common method bias. Furthermore, to minimize the fact of CMB, the study should also focus on longitudinal studies. Thirdly, the theoretical framework of this study includes green innovation and green dynamism as mediating variables. Future studies may also explore the impact of green creativity in supervisor support of green intellectual capital and green work behavior of employees for ultimately improving sustainable firm performance. This study explored the moderating role of green transformational leadership. Future research can also explore some other factors as moderators, such as green process engagement, green creativity, and employer green passion.

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