

The Impact of Green Human Resource Management on Sustainable Performance: The Mediating Role of Green Servant Leadership and the Moderating Effect of Technological Turbulence

Muhammad Asim Jamali¹, Kamran Khan*², and Muhamad Tahir Malik³

^{1,2,3} AlHamd Islamic University, Quetta, Pakistan

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Abstract: The present research study explores the crucial and positive effect of green HRM (GHRM) on sustainable performance by mediating role of Green servant leadership (GSL) and mediating role technological turbulence (TT) in educational institutes of Quetta, Baluchistan Pakistan. Study utilized conservation of resources (COR) theory to understand how green human resource management (GHRM) practices positively effects green servant leadership and sustainable performance of prospective teachers (SPPT's) through mediating role of technological turbulence. A random sampling method was used to survey 300 prospective teachers and green servant leaders from 03 elementary colleges in the province of Baluchistan (Quetta). PLS-SEM technique used in SMART-PLS Software for analysis. Obtained results show the significant and positive effects of green human resource management are demonstrated upon sustainable performance of prospective teachers (SPPT's) through mediating role of green servant leadership (GSL) and moderation of technological turbulence (TT). The study highlights the need to ensure that positive upper-level management (GHRM) practices are aligned with the objectives of the green servant leaders and sustainable performance of prospective teachers in order to achieve optimal team output through the role of technological turbulence. The fast-changing landscape of educational institutes is driving a move toward environmental performance. The study introduces an innovative variable's structure that has never been implemented in any of Pakistan's school education department.

Keywords: Green Servant leadership (GSL), Green human resource management (GHRM), Sustainable performance of prospective teachers (SPPT's), Technological turbulence (TT), School educational institutes (SEI's)

Corresponding author: phdmanagement.hrm@gmail.com

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1. Introduction

Owing to the strong universal rivalry in entire areas and arenas, it remained unavoidable that this endeavor would extend to all heights of education, including secondary/school education. Secondary education institutions (SEIs) aimed to arrive in that race, chiefly after the creation of global college status and rankings, for the sake of smartness and modernization, as opposite to mere existence. Although professional actions contribute absolutely to the richness of the environment over employ generation, it's thought to also be a reason of ecological devastation (Akande et al. 2025).

Consequently, the aim has become distinctive and advantageously fruitful over the opponents for long-lasting ages, which is termed as competitive advantage. For green perseverance, the green performance of personnel has presently been stood the greatest central contributor to the positive execution of the institutional green vibrant plan (Faruk et al., 2026). Therefore, the criteria of eminence, smartness, novelty, low cost, and flexible organization show a momentous role in the achievement, development, and progress of these SEI's. For the proper protection of the ecology, the green performance is connected to the institutional agendas (Nisar et al. 2026). Presently, societies are depending on SEI's to underwrite the safeguarding and sustainability of the ecology/atmosphere/milieu by contributing imaginative humanoid resources with high aptitudes that are renewable, emerging, and flexible to change when needed. In the framework of specifically secondary/school education sector, the teachers conduct more importantly is vibrant for resisting of ecological devastation that cares about green ecofriendly system. Even though SEIs produce a smaller amount of toxic waste/greenhouse gas or other pollutants than any other corporate/industrial sector, or it should be their prime responsibility to aware the masses about this menace, additionally, they should also instruct existing and upcoming individuals/masses/generations about the importance of adopting pro-environmental behavior. Green performance recently acquired a meaningful consideration from academics ((AlKaabi et al. 2026). Moreover, the prominent and worth mentioning role of college campuses cannot be undermined, their way of operating by having direct or indirect impact upon environment, like consumption of material resources, waste accumulation and its disposal, proper usage of electrical appliances, carbon emissions from vehicles, circulation/movement of people and green activates etc. Primarily secondary/school, higher institutes are progressively spotting the essential requirements to take ecological/environmental responsivities and implement management practices into their procedures, syllabus, investigation, infrastructure, and supplementary of their campus areas; besides, green HR reforms and green approaches are essential for ecological protection (Yusoff et al. 2019). Regardless of this, their advancement in the direction of sustainability is slothful and awful. According to Yong et al., human behavior is still lacking vis regards of green human resource management policies (GHRM), and it should be covered up by taking effective measures, and particularly special working on education sector is the need of the time. For the most competitive/competent advantages of educational institutes, human resources shall be treated as most precious and effective resources. (HRM) specialists must put their divergence on this peculiar assignment plus expand the range of their knowledge by implementation of green management practices, to strengthen the approach that should adopt be essential to HRM practices, and for the environmentally friendly agendas. To scuttle the threat of environmental challenges, HRM strategies for employees (Teachers) shall be adopted promptly. Because greening practices in the institutes have a note-worthy effect on numerous diversified parts of same institute. With inclusion of all these sectors, green human resource management practices stand vital to be supposed as a forecaster of eco-driven environment. In the country like Pakistan, both the academic faculty members and professionals should adopt and implement green supporting policies and procedures in education departments for the achievement of a part of vision 2030 agendas worldwide. For a better class of leadership, it must be

noted whether personnels has adopted green practices or not? Amassed numbers of disciplines highlight the significance of leadership to institutional, and distinctively individual level by incorporating green trends. The servant leadership now emerged as a real predictor of sustainable activities by putting its stress on caring and serving for others. Robertson and Barling suggested by fetching the notion of servant leadership into the ecological domain, precisely by learning how does a type of leadership known as “environmentally specific servant leadership” (ESSL) or green servant leadership, that impacts the attainment of pre-determined ecofriendly objectives. Grounded by Tuan’s interpretations, ESSL or green servant leadership (GSL) is motivated to stimulate and support workforce in accomplishing the institutions eco-friendly objectives, Whereas more or less studies has exposed that ESSL or GSL leadership can mostly be practiced as forecaster of eco-friendly system on the part of staff, but unfortunately sufficient treasure of information is still missing for proper adoption of ESSL or GSL. While talking about the education sector, there is insufficient GHRM practices, principally in the Arabian countries. Even though, worldwide there has been done a mentionable work of research in higher education sector, the current status of GHRM practices in SEIs located in Pakistan specifically in the province of Balochistan (Quetta) remained majorly unmapped. Asim et al. conducted a study on the Pakistani settings and established that SEIs in the country like Pakistan is not sufficiently executing green procedures and practices. They worked out research proposes that there is a persistent necessity for SEIs in Pakistan to articulate wide-ranging stratagems and plans to promote sustainability and environmental awareness in the masses. Adding more, this endeavor also substantiates the practicing of GHRM, Green servant leaders (GSL), Sustainable performance of prospective teachers (SPPT’s), and enhances fresh pragmatic indication to the link between GSL and SPPT’s. Moreover, the investigation delivers genuine and theoretical inferences for explaining green encounters within the secondary/school education sector. Interestingly on the other hand, the notion of technological turbulence (TT), that has been seen in the twenty-first century, is altering all recognized institutional milieus (Kraus, 2019). As a matter of fact, the effect and usage of digital technology, fresh and new innovations are being formed, which is too altering the method effort through outsourcing, online platforms, robotics, upgraded mechanization, and so on (Wilburn, & Wilburn 2018). Working with digital data in real-time strongly changes that how the things are managed, created and used. Current digital systems, services, and technologies are henceforth important for the development of the social order (Saarikko et al, 2020). Productive and positive behaviors have been chiefly connected with electronic equipment such as computers, smartphones, laptops cameras and scanners (Wilburn, 2018) that surprisingly affects the performance positively and in the desired direction. The relationship of technological turbulence and its outcomes on the users are interconnected. Digital familiarity in the workplace defines the usage of computers and smartphones. Cameras and telephones, to simplify the behaviors of employees for positive effectiveness performance (Yost et al., 2019). In some studies, electronic surveillance is used together with electronic monitoring, furthermore, the electronic devices are also used for goodness of the institutions and enhancing the productive/positive behaviors of the employees

2. Literature Review

2.1. Servant Leadership

The servant leadership eventually has an extended and rich history including different eras but in contemporary settings, significant contribution has been made by Robert Greenleaf (1970). Although Greenleaf strengthened the notion of servant leadership, albeit Greenleaf is not its initiator. Basically, servant leadership is thought to be started from ancient times. “The leadership was a facility/service of their folks and nation “the statement established by ancient emperors (Sendjaya & Sarros, 2002). Servant leadership it-self is affected and created numerous effects on different cultures/sub-cultures of the globe, and servant leadership sometimes deemed as it is started by Christian leadership by pattern. Winston and Ryan maintained that (2008), the servant leadership style teachings are similar to that of Confucious; similarly, few concepts of servant leadership we can see are in Zhou’s Rule (111 - 249 B.C.) The old-styled ancestral leadership of the Bedouin-Arab ethos too associated with the notions of servant leadership, as these orthodox leaders satisfy the needs and demands/desires of their family and people with fully and entirely selfless concern. Unquestionably, the esteemed Jesus Christ two thousand years ago, created and set the best example of servant leadership. Sendjaya and Sarros (2002) submitted that Jesus stood the earliest who “originated the concept of servant leadership to daily human effort” (p. 58). Besides all of these theories and perceptions, the best of all the times example has been set and witnessed by the worlds populace is of Prophet Muhammad (SAWW), who clearly manifested by his all actions that he was a powerful man of action, who has created amazing and eye brows raising history by serving his people diligently without making any of his any personal interest, So far approximately about 1445 hundred years ago. The predecessor caliphs also made history of servant leadership by following his footsteps. Notwithstanding its introduction as an organizational leadership style, more than 414 books have been published and more than 481 dissertation and peer-reviewed articles in the last four decades (Green, Rodriguez, Wheeler, & Baggerly-Hinojosa, 2015) the present pragmatic studies (Laub, 1999), servant leadership is yet in its infancy of theoretic growth (Nisar et al. 2026).

2.2. Green HRM and Green Servant Leadership

Amongst all other issues which the organizations are facing, especially with regards of environmental concern, there is increasing pressure on these to counter and curb that conundrum by adopting such strategies and methods, like greening the organization through green human resource management techniques and practices. Consequently, the environmental enrichment/health by the GHRM is the dire need and demand of time and its positive effects on servant leaders (Employees) shall also be observed. Basically, just HRM is a deliberate method to efficiently deal with workforces or servant leaders in an institute so that they can manage their tasks by achieving competitive advantages. On the other hand, the aim of Green HRM can be defined as HRM practices and guidelines that sustain a profession, and notably its objective is to thwart any harm or destruction happening from anti-environmental activities in institutes/organizations (Yusoff et al., 2018). The Green HRM does and doctrines seem as set of methodologies, guidelines, procedures, and stratagems

that encourage an institutes/organizations workforces or green servant leaders to implement green behavior and make an environmentally well-matched working atmosphere that is resource-efficient and socially responsible (Ren et al., 2018). Specifically, the green HRM emphasizes training workforces/personnels or up-coming green servant leaders in green practices and augmenting employees' environmental awareness, environmental efficiency, environmental involvement, and environmental performance (Pham et a., 2019). GHRM, that has been explained via pro-environmental part of management, attempts to augment eco-friendly activates and intermingles the pro-environmental stability. For the stability of economy, environment and social retention, it embraces entire behaviors (Farrukh et al., 2024). By incorporating/adopting and utilizing human resource management approaches, the researchers have accepted GHRM as a very fresh and new discipline of study by keeping in mind the management of environment of any institute/organization. GHRM contains essentially five key points, which are: (1) Green hiring plus selection, (2) Green training and development, (3) Green performance management, (4) Green salaries/monetary benefits and rewards, (5) Green contribution/participation. Institutes/organizations that adopt these policies may gain credibility in the eyes of current and prospective people, to make future generations aware. By the implementations of advanced GHRM policies and practices, the higher education departments/institutes are demonstrating a prominent role by educating and preparing ahead generations/masses. Conversely, like other disciplines, there exists absence of comprehension that in what way educational institutes vary from other organizations/institutes in context of GHRM. Green does and practices like sustainable procurement, eco-friendly initiatives, green programs/curriculum, and employee engagement are thought to be recognized as appropriate to educational institutes. By incorporating, for instance, green practices and highlighting environmental problems/dilemmas through integration to their syllabus/curriculum, the educational institutes can minimize environment pollutants. The specific attributes of the educational institutes include, getting aware of the masses and social/societal/communal groups about benefits of green practices through their propagation eloquently, that is quite different from other institutions/organizations/departments. Furthermore, the educational institutes are subject to changing protocols plus participants pressures, demanding distinctive method to GHRM that interprets their qualities/attributes and social characteristics (Zaman et al., 2025).

Therefore, the following hypothesis has been developed based on above reviewed literature:

Hypothesis 1: GHRM is positively associated with Green Servant leadership

2.3. Green HRM and Sustainable Performance of Perspective Teachers (SPPTs)

The Green Human Resource Management (GHRM) of a teacher training college specially on sustainable performance of prospective teachers (SPPT's) plays a significant role in ensuring the competency, motivation and development of its educators. Investing and encouraging advanced teaching to Faculty, staff and relevant participants from HR requirement procedure and in turn, improve the pupil's creative, sustainable, ecological caring and structured to bring positively (AlKaabi

et al. 2026). It is also estimated that till 2035, Upper educational institutes will have 80 Million pupils and 3 million teachers offers an opportunity for sustainable practices and helps to mixed up the economy with concern for ecological environment sustainability (Mint 25th September 2023) view of sustainable performance of prospective teacher duties and responsibilities, which requires teacher-training colleges to comply to all rules and by rules governing competition in the education field. A healthy GHRM certainly bolsters the overall internal environment of the teacher training college and fosters sustainable performance of prospective teacher development, involvement and satisfaction with the job. The sustainability is an state or condition, within which the financial, social additionally the ecological objectives get accomplished containing a sense of balance over sustainable expansion in parameters of Selection, recruitment, training, and development of executives, and they obviously perform the responsibilities of human resource management assigned to their workforces in an ecologically responsible manner (Sukardi et al., 2023). A few research studies have been conducted to determine the level of GHRM in a teacher training college and the factors affecting it. Specially the ecological Consciousness, making connection with the native people of the concerned area, supporting cultural competency plus assimilating sustainability with education by bolstering up green initiatives and integrating ecological related studies across disciplines portrays increasing importance on sustainability specially in educational programs (Aithal et al., 2023). This positive GHRM makes existing systems more effective and makes the teacher training colleges more receptive to the introduction of relevant additional system. Though many studies are conducted in the area, GHRM suggests positive relationship between GHRM and sustainable performance of prospective teachers as discussed above. Thus, the present study suggests the existence of positive relationship between GHRM and sustainable performance of prospective teacher development of teacher training colleges.

Hypothesis 2: GHRM is positively associated with sustainable performance of prospective teachers

2.4. Technological turbulence as a mediator between green servant leadership and SPPTs

In the present-day settings, we have witnessed that the core basis of modern The foundation of modern humanity is digital alteration/change/transformation, that contains technologies like IoT, AI, blockchain, robotics, and 3D technologies. Digital alteration/change/transformation (DT) denotes “a procedure/course that purposes to advance an organization/institute by generating noteworthy variations to its properties by arrangements of information, computing, communication, and connectivity technologies” (Kraus, Schiavone, Pluzhnikova, & Invernizzi, 2021). Since clients are continually linked to electronic equipment, the foremost problem which the businesses are suffering from is businesses face today is assimilating and employing fresh digital technology. Plentiful profits may possibly produce by these modifications, comprising improved efficiency, entrance to fresh markets, also a development in brands acknowledgement or appearance (Dhoni, & Kumar, 2023). The prominent businesses prerequisite to change in two keyways to attain digital transformation: primarily, through using technologies in the value chain, and secondly, by affecting their people, culture, and knowledge (Bag, Wood, Telukdarie, & Venkatesh, 2023). Consequently, theoretical as well as

business literature has started to draw additional consideration to the mediating role of digital transformation comprising relationship between green servant leadership and performance of prospective teachers. The researchers have seen that in what manner organizations/institutes are operating digital transformation programs to find and increase workers/officers task performance besides accounting imaginable effects for output, job satisfaction, and privacy problems/issues (Oztemel, & Gursev,2020. The execution of technologies like data analytics, the Internet of Things (IoT), and cloud computing, which can be used to gather and analyze employee data in real-time, is a shared\ part of these ventures/projects. Likewise, investigation by (Huang, 2023) observed how electronic devices affect employee performance. They accentuate the latent effects of monitoring systems, like computer monitoring or GPS tracking, on task execution, including how they may increase responsibility. The mediating role of digital transformation in this context is explored in work by Zheng et al., 2021). Researchers like Nobari and Dehkordi (2023). highlight the significance of organizational culture, industry context, and employee perceptions in shaping how digital transformation mediates the surveillance-task performance relationship.

Hypothesis 3: Technological Turbulence serves as mediating factor for green servant leadership

Hypothesis 4: Technological Turbulence serves as mediating factor for sustainable performance of prospective teachers

2.5. Conservation of Resource Theory

This theory presents critical research and framework used to develop and explain green servant leadership (GSL). First, the chapter deeply explains the related theory that clearly explains the study model. This theory includes green human resource management (GHRM). After research theory, this chapter states the hypothesis development of the study variables that directly affect sustainable team performance (STP). After then, top management support's Moderating role is explained in the servant leadership, green human resource management, and sustainable team performance too discussed. This theory is the most relevant theory, which clearly explains and supports our study research model. The basic principle of (COR) theory is that individuals make continuous attempts to acquire, maintain, preserve, and make sure that they value (i.e., resources) (Hobfoll, 1989). In other terms, people are trying to protect their current resources (conservation) and seek new resources (acquisition) (S. E. Hobfoll, 2011a). Primarily, resources are used to grasp stress (S. E. Hobfoll, 2011a). Mental stress is a response to a situation where there is (a) chance of a net resource loss, (b) net resource loss, or (c) no resources benefit after investment in resources. The potential and real loss of resources are seen as necessary for generating stress. Hobfoll (1989) defines resources as “those elements, personal characteristics, conditions, or energies which are valued by the individual or that serve as a means for the accomplishment of those things, personal traits, conditions or energies. The researcher has frequently studied conditions concerning their explanatory pressure effect. Personal traits are resources to the extent that they typically assist in mitigating obstacles. Estimating developments based on previous incidents is in the best interest of a person: a person's abilities and characteristics improve resistance to stress (Hobfoll & Freedy, 2017). Moreover, what is significant is the impact of social

support. Whether one respects and encourages positivity and a perspective shown across challenging circumstances, or one may practice it (Stevan E Hobfoll, 2018).

Resources are valuable because they help create other resources; therefore, they are typically not graded by their essential value. A work recovery study was undertaken by Gilbert, Foulk, and Bono (2017), offering information on energy resource's importance. The study reveals the break after work has been shown to solubilize energy resources and raise exhaustion for employees and opportunities for recovery and time away from the job-energy resources. Finally, it might come to the reader's attention that any of the categories above do not provide social support. Instead, social ties are seen as a tool to the degree that they promote the conservation of essential resources. The theory is in line with the research that finds social support is beneficial when provided for situational needs and dangerous or harmful when delivered (Pow, King, Stephenson, & DeLongis, 2017). The hypothesis also assumes that some individuals who lack the options are spending less on their current capital. This can be seen as a resource loss tactic because resource loss can be expensive with small chances of success. If they do not, they find themselves powerless, which further leads them to lack resources. There is an opportunity at this point to interfere before the individual suffers any damage. Managing resource risks versus real resource losses by decision-making has rarely been observed. However, there has been a concern about how declared resource loss decisions are frequently decoupled from practice (Heese, Krishnan, & Moers, 2016; Stål & Corvellec, 2018). Appraisal of resources is the central component of COR theory. So far, the focus has been on analytical losses and common societal expectations on what constitutes a loss. However, the theory also suggests a vital role in evaluation (Lazarus & Folkman, 1984). However, it should be stressed that even when perception is crucial, normative inclinations regarding how resources are evaluated and what determines loss guide the evaluation of people about their surrounding environment and themselves. In this respect, Rokeach (1973) presented ample evidence for specific (i.e., normative) principles within similar societies and classes. The scale of life occasions provides proof that an accepted range of weight applies to events ranging from standard to extreme. The eye shifting, human resources can also be conserved by reassessing the hazard as a challenge (Gerber et al., 2020). Individuals may also be involved in what they may gain from instead of what they might sacrifice, learning about a specific situation. Stevan E Hobfoll (2019) has argued in the past that such a transition can no longer be idealized as happening with other stressors (Sullivan et al., 2018).

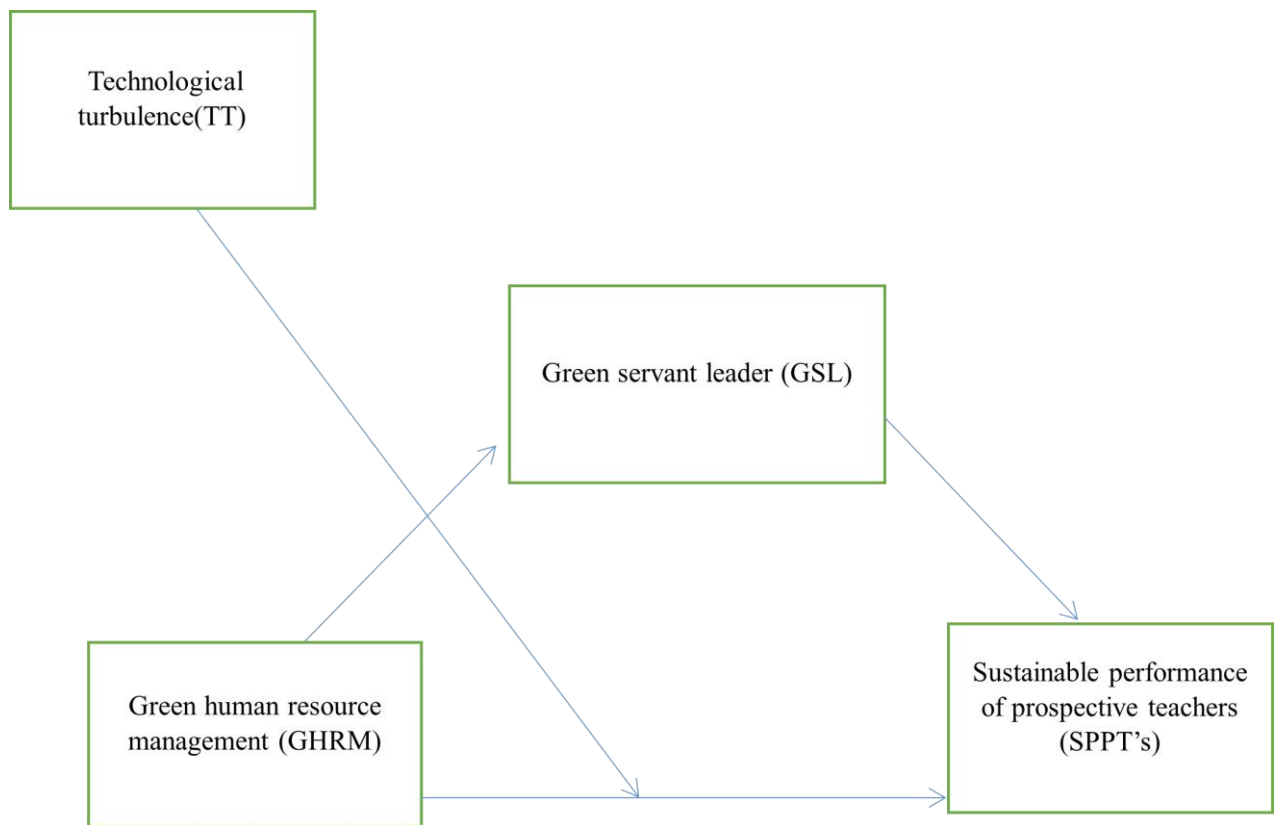


Figure 1: Framework

3. Methodology

This part states the approach used in collecting the statistics/data, the populace of the study, sample size plus sampling technique used. This debates the investigation plan which includes sample processes plus the explanation for selecting the study area, sources, and kinds of data and sum-up by the limitation of the data.

3.1. Research Design

This study is quantitative, which aims to provide statistical information regarding our subject to develop better results that can convince the readers about the validity and reliability of the hypothesis (Saunders & Lewis, 2012). According to Saunders and Lewis (2012), explanatory research is causal research used to check the relationships among variables. A cross-sectional field study survey was used in the study as this approach guarantees the sampling of the representatives of the population unit and aims to increase the generalizability of the findings (Scandura & Williams, 2000).

3.2. Data Collection

The specific data will be gathered by doing a survey and using questionnaires to count/measure each variable of concern. The questionnaire consists of four major sections measuring demographics, Green Servant Leadership, Green HRM, sustainable team performance, and technological turbulence. For neglecting confusion, four scales measurement format extending from 1 (strongly disagree) to 5 (strongly agree). Earlier investigations proposed comparatively slight modifications to answer formats, they don't disturb their validity (Matell & Jacoby, 1971). It is planned that the following instruments are adopted to collect data.

3.3. Sampling and Population

The population of the study is 4-elementary educational institutes of Baluchistan/Quetta. As entire population cannot be studied due to limited time and resources therefore the sample size has been drawn by the rule of thumb. Based on the rule of thumb 10% of the population is taken which makes 300 green servants and prospective teachers. 330 questionnaires were sent to the respondents through google form as well as personal visits in educational institutes. 305 questionnaires received back. 5 questionnaires were not properly filled so 300 data of respondents finalized for analysis. The key objective of the sample is primarily to choose a distinctive group of mechanisms that show the features of the populace. The data is not being collected from the entire population mostly; sampling happens to be the only applied option for data collection. Because marks from the sample are generalized to the entire population, maximum care is required for sample selection. It is proposed that the sample size is consist of at least 300 green servants and prospective teachers from elementary educational institutes of Pakistan (Balochistan /Quetta). It is also intended that the educational institutes are selected based on judgment sampling and the individual fellow within the institute be selected through simple random sampling.

3.4. Instruments

3.4.1. Green Servant Leadership

The SL scale established by Liden, Wayne, Meuser, Hu, Wu, and Liao (2015) are applied in this study. That scale has 7 items, and the Cronbach's alpha specified in the study was .95. An example item is 'My supervisor forms my profession advancement a priority.

3.4.2. Green HRM

We cast a 10-element scale developed by Singh et al. (2020) to count Green HRM with Cronbach's α for the scale was 0.85. The scale for counting/measuring items extended from strongly disagrees (1) to strongly agree (5).

3.4.3. Technological Turbulence

We use a 6-item scale created by Islam, Doshi, Mahtab, and Ahmad (2009). Cronbach's α for scale was 0.89. A sample item is, "Sufficient incentives were provided by top management for the implementation of the project". The items were judged/measured on a 5-point Likert scale, going from strongly disagree (1) to strongly agree (5).

3.4.4. Sustainable Performance of Perspective Teachers

The sustainable performance section is taken by the worth of each group/team's company at the end of the imitation/simulation. The Imitation would plan to grasp real tactical decision-making receptiveness to varying situational needs through the imitation. In the study, we assumed the ten items used to measure team performance (Walumbwa, Avolio, & Zhu, 2008).

3.4.5. Control Variables

Age, capability/experience, gender, and educational level are established to effect plan accomplishment; therefore, these variables will be added as control variables (Aga, Noorderhaven, & Vallejo, 2016).

Table 1: Respondent’s Profile

Demographic characteristics	Description	%
Gender	Male	54.9
	Female	45.1
Age	18-20 Years	22.2
	20-25 Years	32.5
	26-30 Years	6.7
	31-35 Years	18.9
	36-40 Years	6.3
	41-45 Years	7.6
	46-50 Years	5.8
	Academic qualification	Intermediate
	Graduation	34.7
	Masters	17.6
	MS/M.Phil or higher	8.9
Working experience	Less than 1 year	35.4
	1-5 Years	26.2
	6-10 Years	12.1
	11-15 Years	9.7
	16-20 Years	7.3
	Above 20 Years	9.3

4. Results

4.1. Data Analysis and Statistics

The Data analysis was performed using SPSS latest version (SPSS-26) to handle the data and analyze preliminary data such as descriptive analysis, mean, standard deviation, frequency analysis, and common method biases. Furthermore, a partial least square structural equation (PLS-SEM) was used to analyze the outer model (Measurement model) assessment for validity and reliability of the sample data and inner model (Structural model) assessment for the hypothesized relationships (Hair et al., 2020; Sarstedt et al., 2017). While analyzing quantitative data gathered from the questionnaires, Statistical Package for Social Sciences (SPSS-26) latest version was used. Researchers have primarily used this software as a data analysis technique (Tabachnick et al., 2007). Therefore, this package was used to screen the data in terms of coding, missing data, outliers, normality (i.e., using skewness and kurtosis), and defining the respondents' characteristics who filled the survey questionnaire (Tabachnick et al., 2007). Process Hayes macro for mediation and moderation was used for analysis. Results have been

presented in tabular and graphical forms.

4.2. Measurement Model

To test hypotheses and measurement of the research model, we used PLS-SEM (Partial Least Square-Structural Equation Modeling) technique by using SmartPLS 4 software. The PLS-SEM technique is more relevant for exploratory research and complex mediation analysis (Hair et al., 2018). PLS-SEM technique is used for goodness of fitness, statistical power, sample mediation analysis. It contains several necessary methods for model assessment and robustness ways to check results (Hair et al, 2018). After running the PLS-Algorithm confirmatory factor analysis was made. The diagram below shows the items' loadings and relevant factors within specific range. All items of the constructs fall into the relevant category. After deleting the low loadings items $<.60$ again PLS-Algorithm was run and there were established four basic factors, i.e. Green human resource management, Green servant leadership, Sustainable performance of prospective teachers and Technological turbulence.

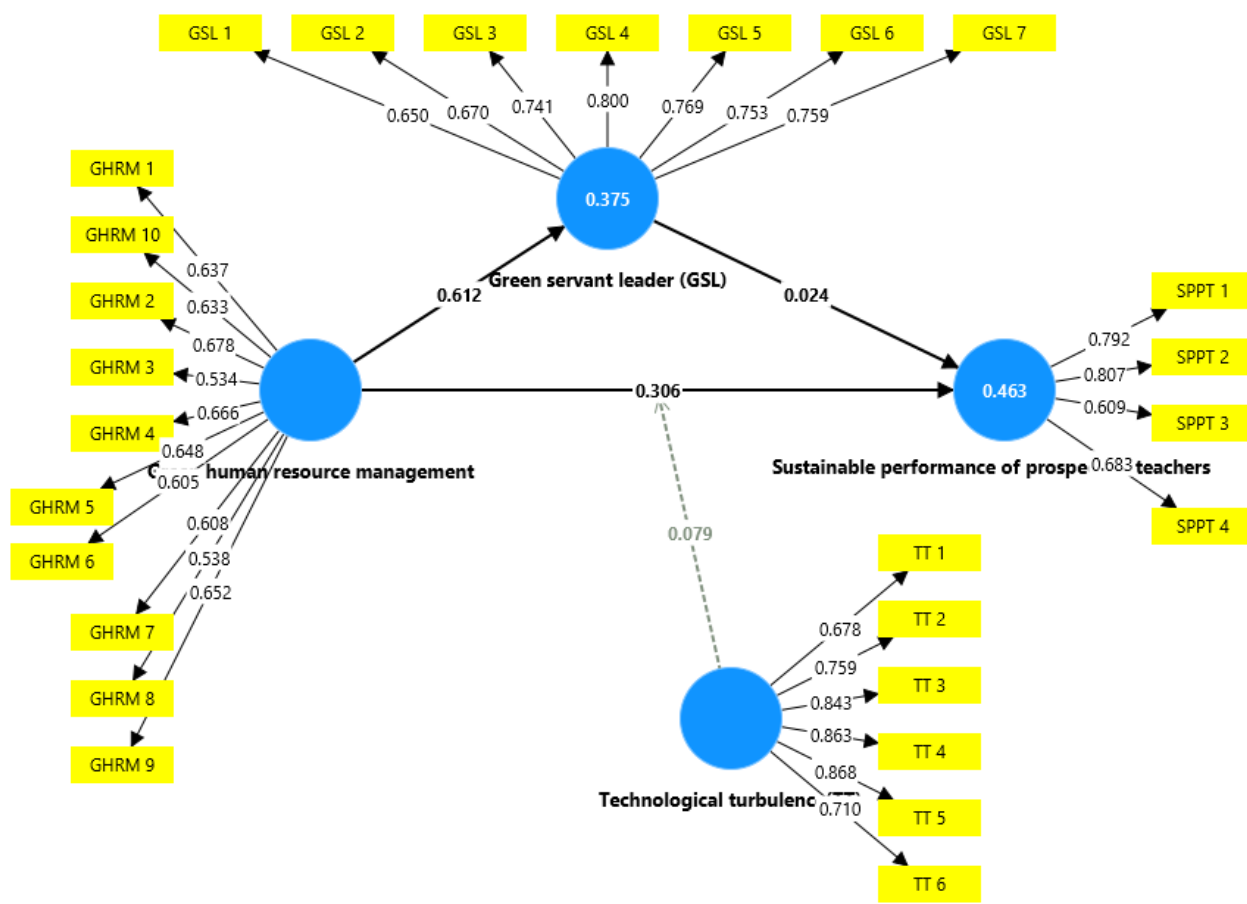


Table 2: Validity and Reliability for Constructs

Indicators	Constructs	Loadings	VIF	AVE	CR(a)	CR(c)	Cr.A
	Green human resource management			0.387	0.825	0.862	0.823
GHRM 1	Great effort goes to the select right person	0.637	1.753				
GHRM 10	The employee gets a reward for acquiring specific sustainable educational competencies	0.633	1.956				
GHRM 2	Hiring only those who possess sustainable educational values	0.678	1.743				

GHRM 3	Considerable importance is given to green staffing process	0.534	1.46				
GHRM 4	Every employee undergoes mandatory sustainable development	0.666	1.74				
GHRM 5	Sustainable academic development training is designed to enhance employee's	0.648	1.717				
GHRM 6	sustainable educational skills & knowledge						
GHRM 6	Employees have to use sustainable educational development training in their jobs	0.605	1.792				
GHRM 7	Performance appraisal records sustainable academic performance	0.608	1.545				
GHRM 8	Performance appraisal includes sustainable academic incidents, responsibilities, concerns and policy	0.538	1.632				
GHRM 9	The employee gets a reward for maintaining sustainable educational management policy	0.652	2.137				
	Green servant leadership			0.542	0.862	0.892	0.858
GSL 1	My instructor can tell if something work-related is going wrong	0.65	1.542				
GSL 2	My instructor makes my career development a priority.	0.67	1.509				
GSL 3	I would seek help from my instructor if I had a personal problem.	0.741	1.822				
GSL 4	My instructor emphasizes the importance of giving back to the community.	0.8	2.043				
GSL 5	My instructor puts my best interests ahead of his/her own.	0.769	2.435				
GSL 6	My instructor gives me the freedom to handle difficult situations in the way that I feel is best.	0.753	2.333				
GSL 7	My instructor would NOT compromise ethical principles to achieve success	0.759	1.759				
	Sustainable performance of prospective teachers			0.529	0.744	0.816	0.712
SPPT 1	My trainer provides support for all students	0.792	1.461				
SPPT 2	My teacher presents the information in a way that is easy to understand	0.807	1.577				
SPPT 3	My trainer cares about my academic and social well-being	0.609	1.454				
SPPT 4	My trainer motivates me to give my best effort	0.683	1.549				
	Technological turbulence			0.625	0.886	0.908	0.878
TT 1	I enjoy doing my work on a computer	0.678	1.639				
TT 2	The challenge of learning about computers is very exciting	0.759	1.834				
TT 3	I know that computers give me opportunity to learn many things	0.843	2.458				
TT 4	The computers are valuable tools that can be used to improve the quality of secondary education	0.863	3.321				
TT 5	Instructors should be well aware about using computers in their classrooms	0.868	3.208				
TT 6	I believe that the more often instructors use computers, the more I enjoy learning	0.71	1.483				

In the assessment of the model first thing is to establish construct validity, reliability, convergent validity and discriminant validity of the constructs. The loadings of the items were mostly above 0.60, the values of composite reliability > 0.70 and values of average variance extracted (AVE) for the 3-items are greater than 0.50 which are acceptable for model assessment (Sarstedt et al., 2017). Before assessing structural model collinearity of the constructs must be examined, this process is done in partial least square by calculating VIF values. If the VIF values are greater than 5, it indicates the problem of collinearity in the data. It can also occur if the values rely upon 3 to 5 (Lett et al., 2014). Table 2 shows that the VIF values are perfect and there is no issue of multi-collinearity in the data.

Table 3: Discriminant Validity

Constructs	GHRM	GSL	SPPT	TT	TT (x) GHRM
GHRM					
GSL	0.710				
SPPT	0.792	0.469			
TT	0.895	0.403	0.727		
TT (x) G HRM	0.140	0.047	0.062	0.212	

GHRM: Green human resource management, GSL: Green servant leadership, SPPT: Sustainable performance of prospective teachers, TT: Technological turbulence

The next important thing to consider is discriminant validity and HTMT ratios. Table 3 presents the higher diagonal values of each construct from its corresponding correlation that is best for discriminant validity, (Fornell & Larcker, 1981).

Table 4: Heterotrait-Monotrait Ratio (HTMT)

Constructs	Heterotrait-monotrait ratio (HTMT)
Green servant leader x Green human resource management	0.710
Sustainable performance of prospective teachers x Green human resource management	0.792
Sustainable performance of prospective teachers x Green servant leader	0.469
Technological turbulence x Green human resource management	0.895
Technological turbulence x Green servant leader	0.403
Technological turbulence x Sustainable performance of prospective teachers	0.727

Henseler, Hubona, and Ray (2016) criticized the Fornell and Larcker (1981) criteria discriminant validity which shows low detection of reliability. They have recommended alternative approach in assessment of discriminant validity: Heterotrait-Monotrait (HTMT) correlation based on Multitrait-Multimethod matrix. Kline (2011) suggested that if HTMT values are greater than 0.85 then it is problem for assessing Discriminant validity. Table 4 shows that all values of HTMT are below The Effects of Green human resource management and Green servant leadership on Sustainable performance of prospective teachers... 99 0.85 which represents the significant level of the constructs. Similarly, 5-values of Heterotrait– Monotrait (HTMT) ratios that are presented in Table 4 are less than a threshold of 0.85 and acceptable for the measurement of inner model constructs (Henseler et al., 2016).

Table 5: Hypotheses Testing

Constructs	BETA	t value	P values	Conclusion
Ghrm ->GSL	0.612	14.512	0.000	Accepted
Ghrm-> SPPT	0.306	2.947	0.003	Accepted
GSL-> SPPT	0.024	4.414	0.000	Accepted
TT -> SPPT	0.421	4.818	0.000	Accepted
TT) x GHRM -> SPPT	0.079	2.578	0.010	Accepted

The relationship of LGS>WIR T-value 2.789, p-value =0.005, LGS>OC>WIR (T-Value, 11.79, p value=0.0000) and OC>WIR (T-value 2.82, p-value=0.005). P values should be less than 0.45 and T values should be greater than 1.96. The above table shows that t values are 2.7, 11.7, and 2.8, and all p values are below 0.00 level which is the level of significance, (Sarstedt et al., 2017). The result of Table 6 supported the hypotheses decision.

5. Discussion

The entire research has made it clear that the positive effect of green HRM has drawn its workable implications on GSL and SPPT’s through mediating role of technological turbulence. It was revealed that the merger of positive green HR interventions and institute’s green strategy positively influence green performance of both the servant leaders and prospective teachers. Let’s discuss the same thing by the mouths of various scholars. Initially, Yong et al. (2019) underlined the role of human resources in pursuing a positive green agenda. Similarly, AlKaabi et al. (2026) found that workable positive HR strategy coupled with institutional strategy, and both builds the green human capital of the firm, which increases green performance. On the other hand, studies like (e.g. Hameed et al. 2020; Siyambalapitiya et al. 2018) too recognized that positive green HR practices positively influence the green performance of institute with the help of commitment from top management. However, this research has also found the mediation effect of technological turbulence, which indicates that the implementation of green strategies also depends on the behavior exhibited by the organizational leaders.

The positive effect of green human resource management on green SL and prospective teachers was emphatically found in this research. The existing study climaxes the fact that positive HR practices support the leadership behavior or servant leaders that is required to achieve corresponding

HR goals. In their study, Nisar et al. (2026) maintained that positive HR practices and green leadership stimulate the environmental performance of small and medium-sized institutes (SMIs). This study, however, pragmatically emphasized that positive green human resource initiatives become the basis on which servant leaders and prospective teachers choose and accordingly behave that how to make a healthy environment to live in there. GHRM enables them (SL and SPPT's) to make a healthy and pleasant environment of the institute. The mediation effect of technological turbulence suggests that input from GHRM practices creates an alignment of organizational goals with employees' goals. Therefore, it strengthens the view that green GHRM practices augments positive institutional outcomes. Similarly, this research has established that green GHRM positively influences institutional green performance by making their employees more engaged in green tasks specifically through mediating role of technological turbulence.

5.1 Limitation and future research directions

Amongst all the relevant studies and research, this research also has some limitations, which will become future avenues for research. First, the use of subjective instruments for measuring green HRM practices is a limitation. Although these instruments are widely used in management research, discrepancies might be present between objective and subjective instruments (Obeidat et al. 2018). Second, this research used self-report data, which can become a potential reason for CMV bias. Although self-report data is valid and applied widely in research (Wall et al. 2004), future research should consider participants from multiple categories within an institute. Nevertheless, this research has applied both statistical and procedural measures to mitigate the impact of CMV bias. For a better and more in-depth understanding of the relationship between variables, future research should adopt experimental and longitudinal research designs. In addition, this research has focused on only the Pakistani educational (College) sector; therefore, future studies should replicate this model across other institutions. This study was conducted in the educational sector of Pakistani institute, and research in Western cultures may provide different thoughts and implications. Lastly, this study has discovered the impact of green HRM practices on the servant leaders and prospective teachers for the attainment of an institutional green agenda. Henceforth, future research with a combination of green HRM practices on servant leaders or other variables with different sectors or institutes can also be applied for better results and outcomes.

5.2 Practical implications

After conducting this investigation, the results of the current study will positively add very important influences and treasure to the green HRM and management practices. Initially, this investigation has combined two significant systems of an institution, that are (GHRM system and institutional strategy) and explored its impact on green performance, which stood ignored formerly (Akande et al. 2025). Although, the present study has rejoined to the call for more experimental research on the synergetic effect of GHRM practices and their implementation on institutional performance (Do et al. 2018; Oke et al. 2012). Furthermore, Renwick et al. (2013) vitalized the need for the implementation and amalgamation of green HRM practices with institutional policies as this placement harvests healthier results for the institution. Secondly, this study positively approves the

viewpoint of green human resource management, which requires the incorporation of GHRM policies and its effects on GSL's and prospective teachers through mediating role of technological turbulence. Consequently, the present exploration enhances the green human resource management literature by establishing that the powerful effect of green HRM policies and practices produces fruitful results for the institution. It highlights the significant role of green human resource management initiatives in the implementation of the organizational green agenda. Thirdly, though numerous researchers have concentrated on exploring the interaction effect of green servant leaders and HRM practices (e.g. Karam et al. 2017; Neves et al. 2018), this research have recognized the pivotal role of GHRM and its effects on GSL and SPPT's. Initially, GSL's and teachers themselves indulge in green behavior; then they act as a promoter and shape the behavior of others(staff/students) accordingly. Fourthly, the dominant mediating impact of technological turbulence specifically contributes to this education sector by providing assistance to GSL's and Prospective teachers. It indicates that positive effect of GHRM practices molds the behavior of GSL's and Prospective teachers through mediating role of TT.

Additionally, this enquiry used conservation of resources theory (Salancik and Pfeffer 1978) to propose a connection between positive effects of green human resource management initiatives and GSL's and SPPT's. It was proposed that people make sense of their institutional environment which shapes their behavior and attitudes. This study reveals that green SL can be developed if the green agenda becomes one of the institution's priorities. Green HR practices coupled with green strategy is a reflection of organizational concerns toward environmental care. Therefore, green human resource incumbents would exhibit green SL and prospective teachers to transform their subordinates into green volunteers. Resultantly, the institution would be able to satisfy the needs of environmental protection which have been raised by various stakeholders. Different scholars (e.g. Luu 2020b; Zientara and Zamojska 2018) have previously applied social information processing theory in green management literature. However, this research maintains that the development of green SL relies heavily on the existence of green strategies and green HRM policies. The theory of the resource-based view was also applied in this study. Green human resource management initiatives promote green servant leaders and prospective teachers within and also outside the institutes. It becomes difficult for other departments to create this kind of synergy, which is strongly embedded in the culture and strategies of the green institute. Thus, the strategic direction along with green HRM policies would enable the institution to achieve goals of environmental care through green servant leaders and prospective teachers specially by mediating role of technological turbulence.

5.3 Conclusion

Generally, most academic institutions have the goal to create efficient and productive pupils, who would generate fruitful and beneficial results for society. The goal of this specific study is to provide growing positive effects of green human resource management upon green servant leaders and prospective teachers through mediating role of technological turbulence. The outcomes of the current research explicitly suggested that implementation of green human resource management policies to the servant leaders and especially to the prospective teachers generate very positive results pragmatically by the usage of technological turbulence, which is thought to be the need of time in this 21st century

digital era.

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