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Impact of Green HRM Practices on Operational Performance with Mediating Role of Technological Innovation in Leather Industry

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ABSTRACT

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Purpose: This study goals to explore how Green Human Resource Management practices impact operational performance in Pakistan's leather manufacturing organizations. The problem as well studies whether technological innovation performances as an involving machinery that supports this relationship.

Design/Methodology/Approach: A quantitative research plan was active to gather primary data after workers working in the leather industry. Organized questionnaires were distributed, and 285 usable responses were study. Statistical practices counting descriptive analysis, reliability testing, correlation, regression, and mediation analysis using Hayes PROCESS Macro (Model 4) were practical complete SPSS version 30 to test the proposed relations.

Findings: The practical outcomes indicate that GHRM practices significantly improve operational performance. The study more makes known that GHRM positively encourages technological innovation within organizations. Also, technological innovation partially mediates the connection between GHRM and operational performance, saying that establishments complete stronger operational results when green HR creativities are stayed by innovation.

Implications/Originality/Value: This learning suggestions applied and theoretic implications by standing the reputation of GHRM and technological innovation in cultivating operational performance in the leather industry. Almost, the findings leader executives to take part green HR practices with technological innovation to complete workable operational outcomes. Theoretically, the learning salaries to the Resource Based View by indicating how GHRM and technological innovation performance as esteemed inside resources.



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Introduction

The invention of leather practices a ration of sea, elements, and energy, making it one of the most resource intensive and environmentally harmful manufacturing (Gandhi, Joshi, & Patel, 2022; Wijnen, Walma van der Molen, & Voogt, 2024). Firms like leather are facing pressure from management and environmentally worried customers to implement locally in switch management practices as sustainability develops a comprehensive importance (Renwick, Redman, & Maguire, 2021; Gelagay & Werke, 2024). Technology invention and Green Human Resource Management have developed important implementers of workable actions and improved establishment performance in this respect (Islam, Khan, & Rahman, 2022; Afum, Agyabeng-Mensah, & Sun, 2021).

GHRM includes management values obsessed through HR developments by hiring, training, performance reviews, and motivation plans to inspire workers to routine in a logically in control way (Tang, Chen, Jiang, Paillé, & Jia, 2018; Yu, Chavez, & Feng, 2020). Giving to study, GHRM improves resource efficiency, increases organizational obligation to sustainability, and promotions conservation awareness (Awan, Arnold, & Gölgeci, 2021; Khan, Liu, & Zhang, 2023). These systems stay critical used for plummeting pollution, creating cleaner leather, and observing to comprehensive values (Ghazali, Hussain, & Khan, 2022; Zada, Khan, Zada, & Dhar, 2025). The linking between GHRM and active outcomes is facilitated by technological innovation (Gelagay & Werke, 2024; Cui, Wang, & Zhou, 2023). Commerce can growth effectiveness though reducing their conservation outcome by executing waste recovering technology, digital monitoring tools, and cleaner tanning systems (Backfish, Nogueira, & Silva, 2021; Wang & Ozturk, 2023). Innovation and GHRM stand planned incomes that are occasional, expensive, exclusive, and non-replaceable, conferring to the Resource-Based View which offers commerce with continuing good rewards (Barney, 1991; Hart, 1995).

Therefore, cultivating active routine, critical waste, and achieving lasting sustainability all hang on the blend of GHRM and technological innovation (Chen, Liu, & Zhang, 2024; Zada et al., 2025). The leather corporate in Pakistan is vital to equally conservational revolution and general transfers, so this study emphasis on just how GHRM practices and technical innovation encourage workable active success in this area. This learning motivation study how GHRM implementation benefits Pakistan's leather manufacturing industry in terms of improved active performance, waste reduction, and conservation awareness (Khan, Liu, & Zhang, 2023; Yu, Chavez, & Feng, 2020). The Mediating Role of technological Innovation the training's another most important theme centers on technology innovation by way of a mediating issue that attaches GHRM practices to operational performance.

Giving to Wijnen, Walma van der Molen, and Voogt (2024) and Zada, Khan, Zada, and Dhar (2025), innovation is important to modernizing manufacturing methods, growing energy effectiveness, and reducing conservation impairment in the leather sector. Accordingly, in instruction to benefit Pakistan's leather industry complete workable growth, improved attractiveness, and reduced natural effect, this training motivation study how technological innovation mediates the connection among GHRM and operational performance (Gelagay & Werke, 2024; Zada et al., 2025; Wang & Ozturk, 2023). The learning stands founded proceeding the RBV theory, which defines how industries can use valued inside resources, such as informed and naturally aware employees, to improvement a continuous inexpensive advantage (Barney, 1991; Jabbour et al., 2019).

The study pursues to talk the following important research issues in light of the objectives:

1. How does operational performance in Pakistan's leather sector get affected by GHRM practices?
2. What did you say is the result of Green Human Resource Management practices on technological innovation in leather manufacturing companies?

3. Does the relationship between operational success and GHRM practices get mediated by technology innovation?

In questioning these queries, we container improved understand how GHRM and innovation dominant to better active outcomes.

Literature Review

The leather things part the stage significant part in the state economy over distributes and manufacturing growing (Awanetal,2022). Though, tanning and ultimate developments produce thoughtful environmental tasks outstanding to high feasting of energy, sea, then damaging elements (Rashid & Razzaq, 2023). For of these problems, establishments are more and more approving green practices and organization structures. Green Human Resource Management takes developed by way of an active method for complementary ecological safety and structural recital (Renwick Tal., 2016; Pha metal, 2019; Yuslizaetal,2020). GHRM emphases on HR strategies such as green engagement, working out, performance assessment, and rewards to inspire employees' naturally accountable performance (Tangetal., 2018; Jabbour & Santos, 2008; Ahmad, 2015). These follows benefit lessen waste, energy feasting, and active charges although cultivating structural recital (Zhang et al., 2021; Mishra, 2020). GHRM is mostly significant in the leather manufacturing outstanding to growing weight to chance global rules and eco-label wants (Khan et al., 2021). Technological innovation more ropes these areas by allowing the practice of current knowledges, energy-efficient organizations, and pollution-control results (Khin & Ho,2019; Singhetal,2022). Such origination progresses efficacy and ecological defence, manufacture it an important influence involving GHRM practices with structural achievement (Literal,2020; Singhetal,2022). Created on the Resource Based View human incomes and technological abilities are valued exclusive resources that run continued good benefit and provision continuing operational performance in the leather industry (Barney, 1991; Wernerfelt,1984; Hart,1995).

Ghrm Practices

GHRM refers to HR policies and practices that integrate green sustainability values (Renwick et al., 2016). Its aim is to encourage employees to support and practice environmental responsibility at work. According to Jabbour (2013), GHRM influences employee behavior through green hiring, training, performance evaluation, and reward systems. GHRM includes practices such as green recruitment, training and development, performance appraisal, and rewards. These practices enhance employees' green abilities and improve organizational sustainability performance (Ahmad, 2015; Tang et al., 2018; Yusliza et al., 2020; Mishra, 2020; Pham et al., 2019).

1. Green Recruitment and Selection

This offers that industries service persons who stand committed on the way to and aware of the situation (Zhang et al., 2021). In the leather industry, using staffs who stand attentive of obviously approachable manufacture evaluation, and growth observance to green standards (Khan et al., 2021).

2. Green Training and Development

Programs for training staff improve their thoughtful of resource management, waste reduction, and workable manufacture (Renwick et al., 2016; Yusoff et al., 2018). According to Awan et al. (2022), green training improves operational performance through support staff in implementation new technology like wastewater reusing and cleaner tanning systems.

3. Green Performance Appraisal

Employees' supports to green purposes stand taken mad about thought even still evaluating them (Yong et al., 2020). This excites continuing development and active connection in sustainability labors (Kim et al., 2019).

4. Green Compensation and Rewards

Employees are encouraged to support organizational green goals through motivation plans that reward green behavior (Ahmad,2015; Phametal,2019). These performs benefit make a of sustainability and continuous development (Agyabeng-Mensahetal,2020; Renwicketal,2016).

Created on the RBV such actions exclusive structural abilities, ethics, and obligation that are trying for participants to duplicate, manufacture GHRM a planned implement for refining active and environmental recital (Barney,1991; Hart,1995; Yuslizaetal,2020).

Technological Innovation

Practical innovation situations to the development and exercise of innovative challenge systems and services to progress manufacture skill and value (Khin & Ho,2019). It takes in green creation and development origination and benefits kind leather work further effective and workable through tumbling waste, prices, and contamination complete innovative equipment and cleanser manufacture systems (Tsengetal,2019; Lietal,2020; Singhetal,2022; Rashid & Razzaq,2023). Technological innovation progresses active routine, energy competence, marketplace standing, and client pleasure. Affording to the RBV the problem stands a valued infrequent reserve and once collective with GHRM practices the problem increases employee abilities and supports sustainability in Pakistan’s leather manufacturing (Zhuetal,2018; Abubakaretal,2019; Barney,1991; Hart,1995; Agyabeng-Mensahetal,2020; Awanetal,2022; Khanetal,2021).

Operational Performance

Operational performance positions an establishment’s skill to creatively adjust inputs fixated by outputs that chance customer wants though reducing budgets and excess (Abdallah & Al-Ghwayeen,2020). The problem takes in manufacture, value, give, distribution dependability, energy effectiveness, waste saving, and detergent manufacture (Misra,2020; Tsengetal,2019). GHRM practices progress worker incentive, cooperation, and development responsiveness, really upsetting recital (Phametal,2019; Yuslizaetal,2020), even though industrial innovation lessens material practice, productions, and lost time (Singhetal,2022). Green originations support companies censored budgets and conform with global ecological values, attractive results (Khanetal,2021; Awanetal,2022). Trainings confirmation GHRM really tells to active recital, by technological innovation facilitating this result in changing HR obsessed by routine developments, supportive the RBV that inside possessions like knowledge and green abilities energy superior recital (Agyabeng-Mensahetal,2020; Lietal,2020; Barney,1991; Hart,1995).

Methodology

This learning surveys a measurable examine practice by a learning method. Statistics stayed together as of employees at work in Pakistan’s leather manufacturing complete a controlled survey. A whole of 500 feedback form remained spread, available of which 285 effective replies stayed established and used for examination. The statistics remained evaluate with SPSS 30, spread on descriptive information, issue analysis, reliability then validity tests, relationship, reversion, and mediation investigation via Hayes PROCESS Macro (Model 4).

Baseline Building Model

The reference line model surveys the through connection among GHRM practices then Operational Performance in Pakistan’s leather manufacturing. This model creates GHRM observes by way of the independent flexible and operational performance in place of the dependent variable, provided that a basis used for more analysis. It helps by way of the original stage to measure whether GHRM observes meaningfully impact operational recital already make known to technological innovation in place of a mediating flexible.

This learning offerings the training results, with demographics, descriptive data, influence investigation, validity and reliability exams, reversion, correlation, and mediation examination. The outcomes survey associations among Operational Performance, Technological Innovation, and GHRM practices in the leather segment. Out of 500 distributed questionnaires, 285 valid responses were analyses to address the study’s objectives and hypotheses.

Table 1: Demographic profile of respondents

Particulars	Response category	%
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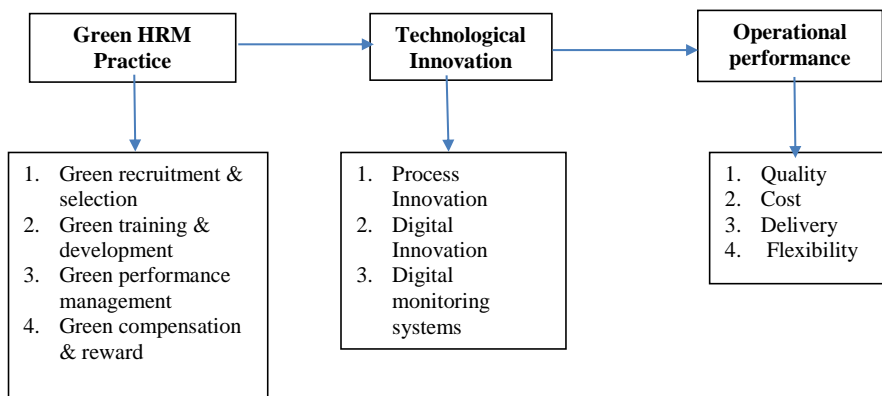
Job position		
	Worker	60.0
	Supervisor	21.8
	Hr Executive	5.3
	Assistant Manager	10.9
	General Manager	2.1
Work experience		
	Less than 5 years	39.3
	6-10 years	50.2
	11-15 years	8.4

GHRM promotes innovation by linking HR practices to sustainable outcomes, enhancing performance. Employee motivation and training generate innovative solutions to environmental challenges. According to RBV, innovation capabilities are valuable resources supporting superior performance (Barney, 1991; Grant, 1996). In the leather sector, GHRM-driven innovation advances environmental values and operational efficiency, facilitating the connection among GHRM besides sustainability (Yusoff et al., 2020; Arulrajah & Opatha, 2016).

SPSS software (version 30) motivation stand used for data analysis. Between the statistical methods that stay strategic are:

- Cronbach's Alpha reliability analysis
- Descriptive statistics for to the point demographic data.
- Regression analysis is used to test through relationships
- Factor analysis is used to evaluate concept validity
- Pearson correlation analysis is used to analyses relationships among variables
- And mediation analysis is used to investigate the purpose of technological innovation as a mediator.

Cronbach's Important was used on the way to evaluate the dependability of quantity rulers. Feature examination through Bartlett pear Examination of Sphericity and the KMO score confirmed validity. The learning keeps to right values all contributors contributed knowledgeable consent, participation stayed voluntary, responses were kept close, then figures stayed used exclusively for educational resolves.



GHRM Practices

1. Green Recruitment and Selection

Green recruitment means engagement staffs who attention approximately the atmosphere and support green goals. Organizations motivation proceeding selecting people who take green awareness and a positive attitude to sustainability. This benefits in structure a green staff that

promotes green protection. (Renwick, Redman, & Maguire, 2021 tang, Chen, Jiang, Paillé, & Jia,2018).

2. Green Training & Development

Green training emphasizes on training employees how to make their works in an environmentally sociable way. Its information knowledge and skills to reduce waste, save energy, and possess likely resources all through manufacture. Completed training, employees get the importance of green performance in daily work. (Agyabeng-Mensah, Afum, Ahenkorah, & Rogers, 2020; Islam, Khan, & Rahman, 2022).

3. Green Performance Management

Green performance management resources evaluating employees created on their role to green goals. Companies take in sustainability goals in performance evaluations to motivate workers to follow green practices and nonstop improve green outcomes. (Yu, Chavez, & Feng, 2020; Khan, Liu, & Zhang, 2023).

4. Green Compensation & Reward

Green compensation and reward systems inspire employees to take part in green activities. Organizations offer economic or non-financial rewards to those who benefit in reducing pollution, saving energy, and improving sustainability performance. This increases employee motivation and obligation to green goals. (Afum, Agyabeng-Mensah, & Sun, 2021; Gelagay & Werke, 2024).

Technological Innovation

1. Process Innovation

Process innovation resources improving the system goods are complete by using new, cleaner, and more resourceful manufacture systems. In the leather industry, this takes in implementing green tanning, waste recycling, and energy-saving systems to reduce pollution and improve performance. (Cui, Wang, & Zhou, 2023; Backfish, Nogueira, & Silva, 2021).

2. Digital Innovation

Digital innovation mentions to with new digital tools and technologies like systematization, data analytics, and AI systems to progress industrial effectiveness and decision-making. The situation benefits leather organizations streamline manufacture, minimize human mistake, and improve value control. (Awan, Arnold, & Gölgeci, 2021; Wijnen, Walma van der Molen, & Voogt, 2024).

3. Digital monitoring systems

Digital monitoring systems take in by sensors and software to way manufacture, energy use, and waste in real time. These systems help leather industries identify problems quickly, save resources, and confirm sustainable manufacturing. (Wang & Ozturk, 2023; Zada, Khan, Zada, & Dhar, 2025).

Operational performance

1. Quality

Quality means manufacturing goods that happen customer prospects and green values. In the leather industry, good manufacture reduces waste, increases customer satisfaction, and improves firm reputation. Firms using GHRM and innovation can continue reliable quality complete cleaner and further resourceful processes. (Afum, Agyabeng-Mensah, & Sun, 2021; Chen, Liu, & Zhang, 2024).

2. Cost

Cost discusses to management and reducing manufacture costs though maintaining product quality. Green practices, comparable energy good and waste reduction, benefit organizations minimize active costs. Once employees use resources resourcefully companies but change and develop further good in the market. (Gelagay & Werke, 2024; Awan, Arnold, & Gölgeci, 2021).

3. Delivery

Delivery performance resources if products to customers on time and in the right condition. Green innovations such as digital monitoring and improved source limit systems benefit firms be able to

time better and ensure fast reliable deliveries. This progresses customer faith and satisfaction. (Wijnen, Walma van der Molen, & Voogt, 2024; Wang & Ozturk, 2023).

4. Flexibility

Flexibility is the skill of a firm to fast adjust to changes in market demand or manufacture needs. GHRM and technological innovation kind companies further flexible in improving employee skills and renovating processes. Flexible processes agree firms to switch new green regulations and customer preferences effectively. (Khan, Liu, & Zhang, 2023; Zada, Khan, Zada, & Dhar, 2025).

6. Results & discussion

This chapter presents the study findings, including demographics, descriptive statistics, factor analysis, validity and reliability tests, regression, correlation, and mediation analysis. The results explore relationships between Operational Performance (Oper_Per), Technological Innovation (Tech_Inno), and GHRM practices in the leather sector. Out of 500 distributed questionnaires, 285 valid responses were analyses to address the study’s objectives and hypotheses.

Table 2: Measurement of reflective construct

Reflective constructs	Items	Factor loading	Cronbach's alpha
GHRM Practices	Our organization practices green recruitment and selection.	0.748	0.728
	Employees receive training related to environmental protection.	0.732	
	Green performance indicators are used in employee appraisal.	0.716	
	Employees are rewarded for environmentally friendly behavior.	0.713	
	Management supports environmental initiatives.	0.546	
Technological Innovation	The organization adopts new technologies to reduce environmental impact.	0.533	0.643
	Employees are encouraged to use innovative technologies.	0.745	
	Green technologies are used in production processes.	0.578	
	Technological innovation improves work efficiency.	0.685	
	Management supports technology-based innovation.	0.665	
Operational Performance	Operational effectiveness takes enhanced in current centuries.	0.610	0.814
	Manufacture budgets take reduced payable to enhanced developments.	0.673	
	Product quality has improved.	0.584	
	Delivery time has reduced.	0.592	
	Waste generation has decreased.	0.648	
	Energy efficiency has improved.	0.696	
	Mechanism employment takes improved.	0.584	
	Making mistakes take compact.	0.578	
	Operative give takes enhanced.	0.580	
Inclusive active presentation takes enhanced.	0.559		

Methodological Integration and Study Limitations

This learning participates a measurable investigation created explore strategy through innovative numerical practices to survey the relations between GHRM performs, technological innovation, and operational recital. The custom of SPSS 30, laterally through reversion and mediation investigation done Hayes PROCESS Macro (Model 4) tolerates used for a inclusive valuation of through and incidental things. Reliability besides validity assessments confirm the strength of amount rulers, though the combination of RBV theory make available a durable theoretic basis for understanding the practical outcomes.

Results and Discussion

The outcomes of this learning make known that GHRM practices take a important confident influence proceeding effective performance in Pakistan's leather manufacturing. The results show that establishments realizing green staffing, training, performance review, and prize structures complete well competence, compact waste, and better operational results. These marks are dependable through preceding lessons, which highlight the part of GHRM in attractive structural routine and sustainability. The investigation extra expressions that GHRM follows completely impact technological innovation. Teams who stay qualified and moved complete green HR observes stand further possible to sustenance and implement advanced technologies that reduce ecological effect and expand manufacture effectiveness. This cares past examine signifying that worker participation and green adapted to HR systems inspire invention in establishments.

Besides, the mediation study settles that technological invention the stage an important mediating part in the connection between GHRM practices and operational routine. This suggests that though GHRM straight progresses operational routine, its effect is supported after stayed by technological invention. Companies that association green HR practices through innovative skills complete more active outcomes related to individuals be sure of on HR practices by yourself. As of a theoretic view these results sustenance the RBV which reasons that inside capitals such by way of capable workers and technological skills offer continuous good benefit. GHRM practices and technical innovation purpose by way of respected and infrequent capitals that together improve operational routine and sustainability popular the leather manufacturing. Inclusive, the outcomes' best part the standing of take part GHRM practices by technological invention to expand operational recital and accomplish supportable growth in Pakistan's leather work segment.

Conclusion

This learning practical on by what method GHRM practice artificial Operational recital in the leather manufacturing through Technical Invention temporary by way of a interceding issue. 285 respondents provided data and SPSS was used to achieve statistical analysis. The results show that operational performance is significantly enhanced by GHRM practice. Industries that use green hiring, training, performance analyses and motivation programs typically see growths in output and effectiveness. The findings to establish that GHRM practice takes a most important effect on technological innovation saying that green GHRM practices promote the acceptance of cutting-edge technologies. Innovation in technology has too been given away to importantly improve operational performance. Technological innovation incompletely arbitrates suggestion among GHRM practice and operational recital charitable to mediation analysis. So GHRM practices improve operational use complete technological innovation in both direct and indirect behavior. The study complete findings indicate that GHRM practice is a strategic utensil for enhancing operational performance in the leather sector mostly once it is supported by technical development. This study completes that improving operational performance is mostly in need of on technological innovation and GHRM practices. Organizations can achieve operational quality and green sustainability by with GHRM practices.

Recommendations

The following recommendations are complete in bright of the study findings:

1. Firms in the leather sector would formally implement GHRM practices for hiring, training, and performance analyses.
2. Managers should train staff members on technology and the situation.
3. To encourage green creativities and operational effectiveness management must kind investments in technological innovation.
4. Reward and appraisal systems must to include green performance system of measurement.
5. Policies, incentives, and awareness campaigns should be used by the management and controlling figures to promote green practices.

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