

From Green HRM to Environmental Performance: An AMO-Based Behavioral Framework for the Pharmaceutical Industry

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Abstract

Sustenance of environmental degradation and the growing regulatory pressure have urged organizations, especially those in the pharmaceutical industry to entrench sustainability in their fundamental operating systems as well as in their human resource process. The present paper constructs an elaborate conceptual framework underpinning the notion of how Green Human Resource Management (GHRM) practices can improve the environmental performance by pro-environmental behaviors of employees (PEB). The model is based on the Ability-Motivation-Opportunity (AMO) framework whereby the model contends that green abilities (training and recruitment), green motivation (rewards, appraisal, engagement) and green opportunities (participation, autonomy, flexible structures) will all combine to create a workplace climate that fosters both voluntary and required environmental behaviors. The paper has synthesized the empirical evidence on how it mediates the environment due to both GHRM systems and the environment through an integrative review of both global and Indian studies (2015-2025). The pharmaceutical manufacturing concerns mentioned in the review, such as waste handling, effluent management, and the compliance requirements are also sector-specific, which makes employee-level involvement essential. The paper provides a theoretical contribution to the field by deriving the AMO model into a multi-level, behavior-based green HRM model and gives a straightforward agenda of future empirical studies based on propositions on the topic, which can be tested. There are also managerial recommendations and sector oriented implications provided to enhance sustainability efforts in the pharmaceutical industry.

Introduction

The increasing environmental awareness in the world like pollution and global warming has necessitated companies to incorporate sustainability in the organization strategy (Xie and Lau, 2023). The pharmaceutical industry, where the process involves very many resources and very complex chemical manufacturing, is under greater scrutiny owing to the massive emission, wastage, and effluent that it generates. The presence of constant pharmaceutical remnants and chemical wastes in the ecosystems has been revealed by the international tests, creating

regulatory issues (Milanesi et al., 2020; Kummerer and Hempel, 2010). In India, which is a major pharmaceutical center in the world, effluent mismanagement and antibiotic contamination persist, and this is why systems that can develop responsible employee attitudes towards the environment should be implemented (Milanesi et al., 2020). Green Human Resource Management (GHRM), which is also called Pro-Environmental HRM, has thus become a strategic tool of integrating sustainability within HR processes of recruitment, training and performance management, rewards and participation (Renwick et al., 2013; Xie and Lau, 2023). There is evidence that GHRM is associated with the increase of waste reduction, energy conservation, and eco-efficiency (Gupta et al., 2023). The studies of healthcare, IT, automotive, and hospitality also facilitate the contribution of GHRM to improving the environmental performance due to knowledge, motivation, and engagement of employees (Atalla et al., 2025; Praveena and Sudarkodi, 2025; Subburao and Elango, 2023; Bangwal et al., 2025). However, Indian research, in particular, in the pharmaceutical sphere, is limited and in many cases focuses on compliance, being not behavioral (Chaudhary, 2019). Ability-Motivation-Opportunity (AMO) framework is a theoretical framework through which the effects of GHRM can be understood on the results of sustainability. According to AMO, employees are likely to behave in an excellent way when they have green abilities, feel motivated, and have the opportunity to take part (Kundu and Gahlawat, 2018; Renwick et al., 2013; Xie and Lau, 2023). The empirical evidence demonstrates that practices of GHRM in alignment with the AMO lead to pro-environmental behavior (PEB) and environmentally responsible behavior (ERB) (Li and Li, 2025; Saeed et al., 2019). ERB is particularly important in high-risk industries (Ones and Dilchert, 2012; Norton et al., 2015; Paille et al., 2013); particularly, voluntary initiatives, problem-raising, and possession of environmental tasks are absolutely essential in this sector. But there is little consistent evidence on Indian pharmaceuticals. Sealing this gap, the current paper will synthesize the literature published since 2015-2025 and suggest a conceptual model that connects GHRM and environmental performance via ERB, and features such mechanisms as green mindfulness, sharing knowledge, and psychological green climate (Li and Li, 2025; Netto, 2024).

Literature Review

Introduction to Green Human Resource Management (GHRM)

The development of Green Human Resource Management (GHRM) has been a strategy in HR, which aimed at aligning the human capital practices and the environmental sustainability targets. GHRM is based on the concept of integrating the environmental management principles into the HRM processes to improve organizational environmental performance through employee attitudes, competencies, and behavior (Renwick et al., 2013; Xie and Lau, 2023). GHRM entails an extensive list of activities, including green recruiting, environmental training, green performance appraisal, reward systems and structures of participation, which all contribute to developing an environmentally responsible workforce. A number of reviews demonstrate that companies that implement full-fledged GHRM regimes become waste-reduced, energy-saving, and more sustainable in their overall performance (Gupta et al., 2023; Atalla et al., 2025). More researchers are emphasizing that GHRM is not just an administration role but a capacity building mechanism that instills the environmental values within the organizational culture. One such option is the incorporation of sustainability in the recruitment activities of a firm, which conveys the sense of responsibility towards the environment and encourages employees who are also

environmentally conscious (Renwick et al., 2013). On the same note, green training improves the knowledge of employees on environmental processes, safety standards, waste separation, and eco-efficient methods (Xie and Lau, 2023).

The recent international research shows that GHRM has a positive impact on the environmental performance in various industries such as healthcare, hospitality, manufacturing, and IT (Bangwal et al., 2025; Subburao and Elango, 2023; Praveena and Sudarkodi, 2025) in general. Nevertheless, it is also found that there exist disparities by sector: service industries tend to focus on token green activities, whereas high-risk industries like pharmaceuticals demand more entrenched behavioral change. This difference highlights why it is essential to comprehend how GHRM can produce environmental results by means of the mechanisms and especially employee-level behaviors. There is a scrutiny on the pharmaceutical industry because of the environmental impact. Research has reported the presence of intractable pharmaceutical residues in water, chemical contamination, and toxic waste, which is highly dangerous to ecology and the health of the population (Milanesi et al., 2020; Kummerer and Hempel, 2010). These wastes are usually the result of the daily operations in the manufacturing process including the use of solvents, cleaning of reactors, discharge of effluents and mishandling of wastes. In India, recurrent negligence of the environment and pollution of animal pharmaceutical complexes with antibiotic residues are detected, which manifest systemic vulnerabilities of environmental management practices (Milanesi et al., 2020). Although technological solutions, including effluent treatment plants, solvent recovery systems, and zero-liquid-discharge installations, can be found, researchers believe the presence of the same employee behaviors is vital to ensuring the environmental standards (Chaudhary, 2019). As an illustration, the adherence to hazardous waste handling procedures, monitoring of leaks, storage of reagents as well as safety are all measures that rely on the vigilance and awareness of employees in regards to the environment. Poor HR systems especially in training and performance monitoring are very often associated with environmental transgression in the pharmaceutical sector. It has been studied that workers tend to focus on performance when put in a hurry and thereby resort to the practice of being environmentally friendly (Chaudhary, 2019). As an illustration, how the hazardous wastes are handled, leak management, reagent keeping, and safety precautions, among others, require the vigilance and environmental awareness of employees. Environmental violations in pharmaceutical industry are often associated with weak HR systems especially in training and performance monitoring. Studies indicate that the workers usually focus on turnaround during the time of rush, thus overlooking environmental friendly practices (Chaudhary, 2019). This has led to the argument of more formal HRM agenda whereby environmental responsibility is integrated in recruitment criterion, performance appraisal, and reward systems. Nevertheless, regardless of the environmental susceptibility of the industry, there is still limited research on GHRM in pharmaceuticals in India and in general, which indicates a very significant gap that the conceptual study will fill.

Ability-Motivation-Opportunity (AMO) Framework and its application to GHRM

The AMO framework offers a good theoretical basis on the effects of GHRM practices on the behavior of workers and the performance of the environmental factors. The AMO model states that employees administer their tasks best when they have the Ability (A), Motivation (M), and Opportunity (O) to act in this way (Kundu & Gahlawat, 2018).

In the case of environmental management, the AMO logic implies that:

- Green Ability is created by training and recruitment processes that strengthen the competencies concerning the environment.
- In Green Motivation, rewards, green performance appraisal, recognition and leadership are key in enhancing the motivation.
- Green Opportunity comes about when employees are stimulated to engage into environmental decision making, sustainability projects, and suggestions systems.

The AMO-based GHRM model is empirically backed. According to Renwick et al. (2013) and Xie and Lau (2023), environmental initiatives should be all-encompassing in involving employees, which implies that they need all three aspects of the AMO to become effective participants. The knowledge is developed through training and rewards keep commitment and opportunities to participate make employees have the power to contribute proactively. To illustrate, green training improves awareness regarding safe chemicals manipulation and environmentally friendly production methods, whereas green rewards strengthen compliance and innovativeness (Xie and Lau, 2023). Recording research also focuses on the refinement of AMO applications, relating them to the intermediate psychological variables, including green mindfulness, sharing of green knowledge, and psychological green climate (Li and Li, 2025; Netto, 2024). These processes define how workers internalize environmental values and then convert them into their uniform behavior at the workplace.

Pro-Environmental Behavior (PEB) and Environmentally Responsible Behavior (ERB)

Pro-environmental behavior (PEB) is behavior in the workplace designed to reduce environmental degradation and encourage efficiency of resources. It encompasses such common practices as recycling, turning off unnecessary devices, minimizing waste, and adhering to environmental guidelines (Ones and Dilchert, 2012; Norton et al., 2015). According to scholars, PEB may be necessary (caused by job requirements) and optional, which demonstrates the personal motivation of employees. Environmentally Responsible Behavior (ERB) is said to be a more developed version of PEB and involves discretionary and voluntary acts that are motivated by the environmental interest and moral duty (Saeed et al., 2019). ERB encompasses self-driven measures like discovery of environmental risks and proposing eco-friendly procedures or assuming the lead in the waste-cutting movements. As Saeed et al. (2019) emphasize, the organizational culture and HR practices impact ERB strongly, particularly those that promote the environmental values and autonomy. The other high-impact behavioral variable is known as Organizational Citizenship Behavior in the Environment (OCBE), which characterizes voluntary behavior beyond the job scope (Paille et al., 2013). OCBE, particularly, can be applied to the pharmaceutical industry, where voluntary vigilance, including the reporting of leakage or unsafe storage of chemicals, can be used to avoid severe environmental offenses.

One thing that is evident throughout the literature is that employee behaviors are the key mechanism that connects GHRM practices with environmental outcomes (Li and Li, 2025). Even the most developed environmental technologies are not used without the involvement of the employees.

GHRM - PEB/ERB - Environmental Performance: Empirical Evidence

Various international research attests that the GHRM practices have a considerable influence on employee attitudes, behaviours and the performance in the environment. In the healthcare sphere, Atalla et al. (2025) prove that AMO-based GHRM is much more effective to enhance the performance of the environment through an increase in PEB. The same findings are demonstrated by Subburao and Elango (2023) in the case of the automotive industry where the effect of performance appraisal and green leadership on PEB and OCBE is significant. Gupta et al. (2023) give more specific evidence in the field pharmaceutical industry several of the rare empirical studies in this field. Their study supports the fact that green recruitment, training, performance appraisal, rewards, and involvement of employees all aid in enhancing environmental performance mediated through green behavior and knowledge improvement. Praveena and Sudarkodi (2025) establish that spirituality and environmental orientation at the workplace reinforce the GHRM-behavior-performance correlation, which implies that situational aspects are relevant in shaping the behavioral consequences in the Indian context. Bangwal et al. (2025) on the other hand, stress the role of green leadership and green culture in the maintenance of environmentally responsible behavior among IT companies. Combined, these results are a good indication of a behavioral mediation model, in which GHRM - PEB/ERB/OCBE - environmental performance.

Research Gaps Identified

An overview of the current literature shows that there are four significant gaps:

- **Sector-Specific Gap:** The research focused on GHRM in pharmaceutical sphere has only a handful of high-risk environmental studies to rely on.
- **Behavioral Mechanism Gap:** Although most of the studies have found that GHRM has an impact on environmental performance, a large number of studies do not specify how ERB mediates the connections between the two.
- **AMO Bundle Gap:** Numerous Indian research studies consider GHRM practices as isolated activities, but not as bundled AMO systems.
- **Contextual Moderators Gap:** Green work climate, environmental mindfulness or green knowledge sharing are examples of variables that are not well investigated in Indian manufacturing.

These gaps explain why a conceptual model that integrates GHRM, AMO, ERB, and environmental performance in the pharmaceutical industry is necessary.

Table 1. Summary of Key Empirical Studies Linking GHRM → ERB/PEB → Environmental Performance

Author & Year	Context (Country/Industry)	GHRM Practices Studied	Mediator / Moderator	Key Findings
Li & Li (2025)	China, multi-industry	Green recruitment, training, appraisal, rewards	Green mindfulness, knowledge sharing	GHRM significantly improves PEB; psychological climate strengthens effect

Bangwal et al. (2025)	India, hospitality	Full GHRM bundle	Environmental commitment	GHRM → PEB → environmental commitment; strong indirect effects
Atalla et al. (2025)	Egypt, hospitals	Green training + green appraisal	—	17.5% variance in environmental performance explained by green HR practices
Subburao & Elango (2023)	India, automobile	Recruitment, appraisal	Green engagement	GHRM enhances green engagement which predicts sustainability outcomes
Gupta et al. (2023)	India, pharma	Full GHRM practices	—	GHRM improves sustainability performance and profitability
Praveena & Sudarkodi (2025)	India, IT sector	GHRM bundle	Green innovation (mediator), green leadership (moderator)	GHRM boosts environmental sustainability through innovation
Saeed et al. (2019)	Pakistan, services	Green training, participation, rewards	ERB	ERB is a strong mediator between GHRM and environmental outcomes

Theoretical Framework

To understand how Green Human Resource Management (GHRM) can improve environmental performance is important that it should be well theorized as to how the HR practices are behaviorally connected to organizational performances. This part is based on the Ability-Motivation-Opportunity (AMO) framework, environmental action behavioral theories, and new constructs like environmentally responsible behavior (ERB) and organizational citizenship behavior in the environment (OCBE) to develop a multi-level conceptual organization. The framework combines the knowledge in GHRM scholarship (Renwick et al., 2013; Xie and Lau, 2023), environmental psychology (Ones and Dilchert, 2012; Norton et al., 2015), and industry-specific evidence in pharmaceuticals (Gupta et al., 2023; Milanese et al., 2020).

The GHRM Foundation of AMO Model

The AMO model states that the performance of employees depends on (A) Ability, (M) Motivation, and (O) Opportunity to participate (Kundu and Gahlawat, 2018). As applied to environmental management this means:

- Employees need to be aware of how to behave in a pro-environmental manner (Ability).
- Employees should desire to act in a green manner (Motivation)
- Employees have to be given and empowered to do it (Opportunity)

When the combination of these factors exists, responsible behavior towards the environment is automatically created in the organizations. The AMO model is one of the most popular ones that scholars use to describe how GHRM works (Renwick et al., 2013; Xie and Lau, 2023). Green recruitment and training develops the capacity through development of environmental knowledge and technical competence. Green rewards and performance appraisal boost inspiration. This is an opportunity to be sustainable through employee involvement, team-based efforts and suggestion systems. According to the recent studies, bundled AMO practices and not isolated HR activities create more powerful environmental results (Li & Li, 2025). Hence, the modern framework views GHRM as an integrated system of practices that is in line with the logic of AMO.

Green Ability: Technical and Knowledge Development

Green ability is the environmental competencies of employees which are based on training, orientation and skill development. Renwick et al. (2013) emphasize the fact that the strongest GHRM practice that contributes to the development of technical awareness of waste management, energy conservation and pollution control is environmental training. The pharmaceutical industry is one of the industries where environmental education is essential because chemical processes and dangerous wastes are complicated (Milanesi et al., 2020). Green recruiting also enhances capacity by recruiting candidates whose values and skills are within the environmental objectives. According to Gupta et al. (2023), pharmaceutical companies that focus on environmentally literate candidates produce more behavioral results and less compliance offence. Therefore, the Green Ability Pathway functions on the basis of:

- **Knowledge acquisition:** learning about the processes that are eco-friendly.
- **Skill building:** safety management, adherence procedures, green practices implementation.
- **Cognitive awareness:** environmental impact knowing.

This is the pathway that would ensure that employees have minimum capability to implement environmentally responsible behavior in the workplace.

Green Motivation: Rewards, Leadership Support, and Incentives

Green motivation consists of rewards, recognition, appraisal and leadership encouragement. It has been found that the predictive validity of green performance appraisal and green rewards is high in predicting pro-environmental behaviors (Subburao and Elango, 2023). When the employees are made to feel that environmental contributions are appreciated and rewarded, they will tend to practice voluntary behaviours like preventing wastage, reporting of leaks, or attending environmental campaigns. Saeed et al. (2019) underline that recognition-based motivation enhances environmentally responsible behavior (ERB), to the extent to which the employees believe that the organization advocates environmental initiatives. It is also important that green leadership identified by Bangwal et al. (2025) is a significant motivational tool that shapes values, promotes environmental consciousness, and exemplifies the desirable behavior. In this way, the Green Motivation Pathway is reinforced:

- sustainability among employees.
- disposition to go an extra mile.
- voluntary undertaking of OCBE.
- active approach to environmental issues.

Green Opportunity: Involvement and Empowerment

Green opportunity is a set of structures where employees are taken in on making decisions, participation in environmental aspects and empowering them to make changes. According to Renwick et al. (2013), environmental innovation is highly predicted by the involvement of employees in environmental teams, committees, and problem-solving groups. Listed opportunity structures are:

- waste reduction suggestion systems.
- participatory green teams
- environmental audits cross-functional.
- open channels of communication.

According to Li and Li (2025), employee empowerment improves green knowledge sharing, which is a driving force behind PEB and ERB. In the pharmaceutical industry, where there are complicated processes that need tight control, the employees should be able to report abnormalities, propose to improve and intervene in unsafe or non-complaints (Milanesi et al., 2020) opportunity structures therefore are necessary as a part of environmental risks mitigation.

Associating AMO and Pro-Environmental Behavior (PEB) and ERB

According to behavioral theories, workplace behavior is influenced by all level of personal values, the perceived organizational support and situational cues (Ones and Dilchert, 2012). These factors are contributed directly by the AMO model;

- Ability - Behavior: Training knowledge enhances the ability to carry out environmentally friendly activities.
- Motivation - Behavior: Rewards and reward encourages a desire to undertake both compulsory and voluntary green actions (Saeed et al., 2019)
- Opportunity - Behavior: With autonomy and voice, employees will have more proactive behaviors and OCBE (Paille et al., 2013)

Accordingly, the GHRM systems that are propelled by AMO result in:

- Pro-Environmental Behavior (PEB)
- Environmental Responsible Behavior (ERB).
- Organizational Citizenship Behavior to the Environment (OCBE)
- Mediation of Behaviour to Environmental Performance

As demonstrated by Atalla et al. (2025), PEB intermediates GHRM-environmental performance connections in healthcare facilities. Gupta et al. (2023) prove the relationship of environmental behavior through the pharmaceutical industry in particular, which is hard to find in the sectoral evidence. Bangwal et al. (2025) discover that green leadership and green culture have a complete mediating effect through OCBE in IT companies. Saeed et al. (2019) emphasize that ERB is a strong indicator of environmental performance in any industry. All these studies prove that the behavioral pathway is the most potent explanatory level of how GHRM affects sustainability results.

Sectoral Relevance: The Importance of Behavioral Mechanisms to Pharmaceuticals

Pharmaceutical activities include dangerous chemicals, solvents as well as delicate biological substances. Thus, any violation of environmental procedures, intentional or not, may have disastrous ecological effects (Milanesi et al., 2020). The origins of environmental lapses are often behavioral failures, including neglecting of safety precautions, failing to properly store or neglecting to follow waste separation procedures (Chaudhary, 2019). This sustains the theoretical point that it is not only technology that defines a good environmental performance in pharmaceuticals but rather behavior. In this way, the AMO-based behavioral mechanism turns out to be not only theoretically consistent but also sectorally inalienable.

Conceptual Model

The conceptual model that has been proposed explains the impacts of the practice of Green Human Resource Management (GHRM) and its contribution towards environmental performance through behavioral mechanisms by employees in the pharmaceutical industry. The model is built on the premise that environmental performance is affected by a combination of GHRM practices, which result in environmental outcomes through the action of employees (Saeed et al., 2019; Paille et al., 2013). It is based on the AMO framework (Kundu and Gahlawat, 2018), the environmental behavior theory (Ones and Dilchert, 2012; Norton et al., 2015), and the current literature about pro-environmental behavior (PEB), environmentally responsible behavior. Considering the risky chemicals and complicated procedures that are inherent to pharmaceuticals, the conduct of the personnel is a key factor in the environmental performance (Milanesi et al., 2020; Gupta et al., 2023). The model is made up of three elements:

- GHRM Practices (AMO bundles),
- Employee Behavioral Mechanisms (PEB, ERB, OCBE), and
- Environmental Performance Results (Liere & Dunlap 1980; Si et al. (2022))

GHRM and Employee Behavior: GHRM green capabilities, which are achieved by recruitment and training and green motivation, which is attained by rewards and environmental appraisal, and the green opportunity achieved through participation and suggestion systems (Renwick et al., 2013; Xie and Lau, 2023). These channels allow the employees to acquire the skills, motivations, and freedom to achieve consistency in PEB (Gupta et al., 2023; Subburao and Elango, 2023).

Proposition 1: GHRM – PEB

GHRM and ERB: ERB is a voluntary behavior, such as reporting hazards, proposing improvements, or engaging in clean-up efforts (Saeed et al., 2019). ERB can be reinforced with motivation and opportunity structure, particularly in high-risk pharmaceutical environments (Bangwal et al., 2025; Milanesi et al., 2020).

Proposition 2: GHRM – ERB

GHRM and OCBE: OCBE involves assisting colleagues in making green practices, environmental knowledge, and making environmental innovations (Paille et al., 2013). Participatory GHRM systems enforce these behaviors (Xie & Lau, 2023; Subburao and Elango, 2023).

Proposition 3: GHRM – OCBE

Behavioral Mediation: It is proven that PEB, ERB, and OCBE intervene in the GHRM-performance relation (Li and Li, 2025; Saeed et al., 2019; Gupta et al., 2023). This is especially important in pharmaceuticals where even the slightest failure can lead to a significant environmental damage (Milanesi et al., 2020).

Propositions 4-6: PEB, ERB and OCBE mediate GHRM - Environmental Performance

Methodology

In this research, the integrative literature review approach will be used to summarise and generalise the current information on Green Human Resource Management (GHRM), employee environmental behavior, and environmental performance in the pharmaceutical industry. The integrative review method is quite appropriate to those issues that feature the conceptual fragmentation and varied theoretical lenses, because it enables the researcher to merge the available empirical data, theoretical constructs, and industry knowledge in one framework. Since there are few studies with a pharmaceutical focus and GHRM research is widely distributed across industries, an integrative review offers the thoroughness and adaptability required to produce an understandable conceptual framework.

Scope of the Review

The review has concentrated on publications done between 2015 and 2025, which coincides with the time frame where the GHRM scholarship has been on a rapid path both in global and Indian environment. It is also during this period that major trends in environmental management policy, sustainability reporting, and compulsory environmental disclosures were developed especially in the emerging economies.

The scope includes:

- Research on GHRM activities of green recruitment, training, appraisal, reward system, and employee involvement (Renwick et al., 2013; Xie and Lau, 2023)
- The studies that investigate the environmental behaviors of employees, such as pro-environmental behavior (PEB), environmentally responsible behavior (ERB), and organizational citizenship behavior towards the environment (OCBE) (Saeed et al., 2019; Paille et al., 2013; Ones and Dilchert, 2012).
- Empirical data between GHRM and environmental performance outcomes, which include pollution, waste reduction, and resource efficiency (Atalla et al., 2025; Gupta et al., 2023).
- Research in the field of the pharmaceutical industry analyzing environmental issues (Milanesi et al., 2020; Kummerer and Hempel, 2010) in the sector.

Preference was made to peer reviewed journal articles and high quality empirical research. Search Strategy and Selection Process.

The review was done in a systematic manner with four steps:

- (1) Identification,
- (2) Screening,
- (3) Eligibility, and
- (4) Inclusion.

Identification

The studies were obtained in accordance with significant academic databases that are generally utilized in the field of management and sustainability studies- Scopus, Web of Science, Google Scholar. Keywords included: Green HRM, Pro-environmental behavior, Environmental responsible behavior, OCBE, Environmental performance, sustainability of the pharmaceutical industry, AMO framework environmental.

Screening

The abstracts were filtered to reduce the number of the other literature by filtering according to the main themes of GHRM, employee behavior, and environmental performance. The focus on the studies that take the AMO framework was particularly strong because of its key role in the mediation of behavior (Kundu & Gahlawat, 2018).

Eligibility

The studies that were of low conceptual and empirical rigor, non-peer-reviewed sources, and articles that were not related to organizational behavior or HRM were filtered out. Also, articles that addressed only the technological or engineering elements of pharmaceutical waste have been filtered out in order to keep the attention on human-centered processes.

Inclusion

The main studies that were incorporated into the final sample were:

- Global GHRM syntheses (Renwick et al., 2013; Xie and Lau, 2023)
- The literature on behavioral mediation (Saeed et al., 2019; Li and Li, 2025).
- Industry-specific results (Gupta et al., 2023; Milanesi et al., 2020)
- Research on OCBE and the environmental citizenship behavior (Paille et al., 2013; Ones and Dilchert, 2012)
- Evidence of the results of environmental performance (Atalla et al., 2025).

This selective array of choice enhances the holistic nature of the conceptual model.

Information Mining and synthetic Methodology

Following the selection of the core studies, data about them were extracted depending on:

- GHRM practices analyzed
- Theoretical paradigms embraced.
- Behavioral variables (PEB, ERB, OCBE)
- Environment performance outcomes.
- Industry/sector context
- Geographical setting
- Methodological (sample, design, measures) attributes.

The integrative method used to synthesize findings was a thematic synthesis one. This included organizing the studies in conceptual groups like:

- GHRM and AMO based mechanisms.
- GHRM and the behaviour of employees in the environment.
- Environmental performance behavioural mediation.

- Environmental risks pharmaceutical specific and workforce behavior.
- These clusters made it possible to compare and integrate studies across studies.
- Rationale behind Integrative Review.

The integrative technique is highly appropriate since the research in GHRM is:

- Theoretically disjointed (Renwick et al., 2013)
- Theoretically varied (quantitative, qualitative, mixed methods)
- Diffused in industries (IT, healthcare, manufacturing, pharmaceuticals).
- Developing other constructs of behavior (ERB, green mindfulness, green knowledge sharing).

Considering such differences, meta-analysis cannot be utilized and systematic review can miss conceptual detail. Therefore, integrative review makes it possible to develop theory and synthesize.

Assuring Reliability and Validity

To enhance credibility:

- Inter-rater reliability was used to assess the concepts through comparing the definitions of GHRM, PEB, ERB, and OCBE as done by other studies.
- Peer-reviewed articles and those that are empirically strong were only included.
- Pharmaceutical-specific evidence was triangulated on various sources (Gupta et al., 2023; Milanesi et al., 2020).

The synthesis was organized according to the AMO framework so that all studies worked in a similar way (Kundu & Gahlawat, 2018).

6. Delivery of the Methodological Process

The output of the integrative review was:

- Synthesized interpretation of dimensions of GHRM.
- Unambiguous indication of behavior mediation by PEB, ERB and OCBE.
- Determination of gaps, especially in the pharmaceutical environment.
- Conceptualized model based on theories and testable propositions.

These methodological processes are used to make the model rigorous and contextually based.

Discussion

This discussion section aims to conceptualize the conceptual model, which has been created in this study, to explore its theoretical relevance, pinpoint its implications in the pharmaceutical industry in sector context, and reasons why the conceptual model contributes to the current GHRM and environmental behavior research. This discussion also compares the AMO logic to the behavioral constructs of pro-environmental behavior (PEB), environmentally responsible behavior (ERB) and organizational citizenship behavior towards the environment (OCBE) and the reasons these constructs are of particular importance in highly regulated risk-sensitive industries, such as the pharmaceutical industry.

Innovation in the GHRM Scholarship in an AMO-Behavioral Lens

This paper aims to contribute to and develop upon Green HRM literature by developing a systematic literature merging the AMO framework and behavioral channels through which HR

practices can influence environmental performance. Previous studies have already recognized that GHRM enhances environmental capabilities, motivation and participation (Renwick et al., 2013; Xie and Lau, 2023), but what is lacking in the discipline is a unified behavior mechanism that can be used to clarify how the practices translate into quantifiable environmental outcomes. The current model bridges this gap by making the clear position of PEB, ERB, and OCBE as central mediators.

Although some past research has suggested specific individual relationships, specifically training enhancing environmental knowledge or rewards enhancing compliance, the present model demonstrates that the interaction of ability, motivation, and opportunity is what triggers the more intense engagement of the behaviors and especially voluntary involvement in the environment. This is in line with theoretical assumptions that behaviors are formed out of interaction of individual capabilities and contextual cues (Ones and Dilchert, 2012). Moreover, the conceptual model added to the literature, considering that ERB is conceptually different than generic PEB (Schwartz, 1977; Stern et al., 1999; Bamberg et al., 2007). ERB voluntary, ethical and internally motivated is a more progressive behavioral level whereby the employees assume the responsibility of protection of the environment even when not mandatory and unobserved (Saeed et al., 2019). Such a difference is essential as in complex industries, compliance is not the most important factor as compared to discretionary behaviors to achieve sustainable outcomes.

Therefore, the research expands the GHRM theory by:

- Associating AMO with advanced environmental behaviors.
- Leading to the exhibition of numerous behavioral intermediates.
- Providing a better insight into what psychological and motivational processes HR systems drive the creation of environmental value.

The Employee Behavior Centrality to Environmental Performance

The second significant learning of the proposed model is that the performance of organizations in terms of environmental performance, particularly the pharmaceuticals, depends on behavior. Although people usually relate environmental sustainability to technological investments or infrastructure improvement, this work confirms the opinion that the behavioral practices define the success or failure of these projects (Gupta et al., 2023).

The environmental behaviour at workplace entails:

- everyday acts of compliance
- safe handling of chemicals
- waste segregation
- adhering to effluent treatment.
- disclosure of the threat to the environment.
- being involved in environmental enhancement activities.

It has been found that training, rewards, involvement, and leadership are GHRM variables that determine these behaviors (Subburao and Elango, 2023; Bangwal et al., 2025). Thus, the focus of the framework on the role of PEB, ERB, and OCBE as mediators is not only theoretically correct but also fundamentally required. Specifically, ERB stands out as a key variable due to the fact that it encompasses the ethical aspect of work on the environment. Saeed et al. (2019) show that ERB is a strong predictor of the organizational environmental outcomes not considering the green behaviours in general, which can have a positive impact on organizations, in case

employees internalise the sustainability values. On the same note, OCBE-employees who willingly assist other workers embrace green activities or those who engage in sustainability efforts have a trickle-down effect of spreading environmental action throughout the departments. Paille et al. (2013) believe that the OCBE is the baseline to create a green culture that would continue to make the environment better even without direct imposition. Therefore, the current model confirms that behavior is the actual driver of environmental performance.

Pharmaceutical Industry Sector-Specific Relevance

The contextualization of the study in the pharmaceutical field is one of the significant contributions of this study, which is an area that has little been covered in the GHRM literature, yet it has numerous environmental risks. Drugs produce toxic wastes, antibiotic wastes, solvent fumes, and bioactive pollutants (Milanesi et al., 2020; Kummerer and Hempel, 2010). These threats increase the outcomes of the employee conduct. Lapses in behavior, e.g. not disposing of solvents properly, by-passing safety procedures, not paying attention to equipment failures, etc. can result in serious consequences on the environment. Chaudhary (2019) adds that most lapses are not a result of a lack of technology but a result of low awareness among the staff or inadequate motivation or the fact that the organizational practices do not support it. This setting in particular is where the proposed model is valid since pharmaceutical processes demand:

- accurate compliance with environmental rules.
- monitoring chemical process behavioral vigilance.
- interdepartmental liaison when auditing the environment.
- active disclosure of irregularities.

Therefore, the integrative AMO-behavior-performance model is not just theoretically interesting, but in practice, it is obligatory in a field in which errors may have serious ecological implications. Further, behavioral mediation perspective is useful in understanding the reason behind the failure of certain pharmaceutical firms to survive in environmental compliance when others may possess similar technologies. The performance outcomes of an organization in the environment depend on the level of employee engagement, which is influenced by GHRM.

Introducing Psychological Constructs to GHRM-Environment Nexus

Another lesson acquired as a result of the literature review is that there is an increased awareness of psychological forces that strengthen the relationship between GHRM and behaviour. Green mindfulness, green knowledge sharing, and psychological green climate are constructs, which are present in the recent research (Li and Li, 2025; Netto, 2024), and they work as internal stimuli of environmental practices. These constructs can support behavioral processes within the suggested model in a number of ways:

- Green mindfulness also improves situational awareness, which causes employees to be aware of environmental hazards.
- The problem-solving among departments is made possible through green knowledge sharing.
- Green climate signals, which are psychological in nature, reinforced motivation since the signals indicate organizational priorities.

Though they were not directly applied in the final set of propositions, these constructs are not dismissed in the discussion and are proposed as moderating variables to be explored in the future through the empirical research.

Theoretical Implications

This model has four important contributions to theory:

(a) Greater Generality of AMO to Environmental Sustainability: AMO model has been used extensively in HRM and hardly in the systematic manner in the environment sustainability research. This paper illustrates behavioral mechanisms in which AMO bundles are converted into environmental value.

(b) Redefining Environmental Behavior: The model enhances deeper conceptualization and does not confuse various types of environmental behavior by differentiating PEB, ERB, and OCBE. Building on the theoretical bases of the discussion, sectoral theory aims to develop a policy that enables sustainable pharmaceutical practices.

(c) Sectoral Theory-Building towards Pharmaceutical Sustainability: A further extension of the theoretical foundations of the discussion is sectoral theory, which seeks to formulate a policy that would allow pharmaceutical practices to be carried out in a sustainable manner. The majority of GHRM theories are created in the industry of services, in hospitality, IT, or in general production. The model adds industry-focused theoretical understanding to an under-researched setting of high risk.

(d) Positioning Behavior as a Core Process: This paper uses behavior as the central mediator in place of behavior as an outcome, which provides a more powerful, more accurate explanatory process.

Limitations and Future Research

The proposed research gives a combined theoretical framework that associates GHRM, employee environmental attitudes and environmental performance in the pharmaceutical industry. Nonetheless, there are a number of limitations that can be used in future studies are:

- **Conceptual, Not Empirical:** The model is theoretical and grounded on the available literature. It currently requires empirical testing through the means of SEM or mediation analysis to test the positions of PEB, ERB, and OCBE in various pharmaceutical sub-sectors. Future research needs to be done on whether the AMO-based relationships are consistent across formulations, bulk drugs, and biotechnology.
- **Limited Pharmaceutical Specific Studies:** There is a lack of GHRM research based on pharmaceuticals especially in India. Available data are primarily related to healthcare, IT, and automotive industries (Atalla et al., 2025; Bangwal et al., 2025; Subburao & Elango, 2023). Since the pharmaceutical business is more risky to the environment, the future research may clarify whether ERB and OCBE act differently in this area (Gupta et al., 2023).
- **Behavioral Constructs Overlap:** PEB, ERB, and OCBE are distinct in this model; however, in practice, there might be overlap. As an illustration, voluntary waste reduction can be considered both ERB and OCBE (Paille et al., 2013). The future studies are advised to perfect the measure tools and apply longitudinal research design to comprehend how these behaviors change (Saeed et al., 2019; Li and Li, 2025).

- **Moderation Requirement and Boundary Conditions:** The model highlights the importance of moderators without considering moderators that include green climate, knowledge sharing, mindfulness, leadership style, and regulatory pressure (Netto, 2024; Bangwal et al., 2025; Milanese et al., 2020). Future research ought to provide test outcomes regarding the reinforcers or diluters of the influence of GHRM.
- **Methodological Issues:** Most studies of environmental behavior use self-reports which can be subject to common-method bias and social-desirability bias. Future studies are to employ multi-source data (e.g., supervisor ratings, environmental audits) and objective data (e.g., waste or energy data).
- **New Environmental issues in Pharmaceuticals:** Pharmaceutical industry is experiencing new demands, including stricter monitoring and antibiotic contamination (Milanese et al., 2020). The future work stream must consider how workers can cope with these issues and what new skills such as green digital skills and automation-related environmental skills emerge.
- **Cross-Cultural and Cross-Sector Comparisons:** The majority of the studies are of Indian, East Asian, or Middle Eastern origin. Further studies must investigate cultural factors on ERB and OCBE and also compare the pharmaceutical industry with chemicals, food processing and others to know whether there is any variation in behavioral mediation.

Conclusion

Environmental sustainability is a recent concern that has attained the burning agendas of different organizations and in highly regulated and ecologically sensitive industries like the pharmaceutical industry. This research aimed at consolidating and promoting the disparate body of literature on Green Human Resource Management (GHRM) by formulating a holistic conceptual framework which details how GHRM practices can impact on environmental performance by influencing employee behavioral process. Based on the Ability-Motivation-Opportunity (AMO) framework (Kundu and Gahlawat, 2018), employee pro-environmental behavior (PEB), environmentally responsible behavior (ERB), and organizational citizenship behavior on the environment (OCBE) are placed at the center of where HR systems help generate environmental values. The analysis of international and national literature shows that GHRM practices, including green recruitment, environmental education, green appraisal, rewards, and engagement play an important role in determining the attitude of employees, their skills, and motivation levels (Renwick et al., 2013; Xie and Lau, 2023). Notably, the studies indicate that these HR practices yield powerful effects mainly when they trigger eco-friendly employee practices (Saeed et al., 2019; Paille et al., 2013). Therefore, behavioral mediation approach is more robust and offers a precise account of the impact of GHRM on the sustainability outcomes than direct-effect models.

The environmental weaknesses related to the pharmaceutical industry, including toxic waste, volatility in emissions of solvents, and antimicrobial pollution (Milanese et al., 2020; Kummerer and Hempel, 2010) demonstrate the necessity of a behaviorally oriented environmental management. The results of this conceptual model imply that the inability to perform well in the environment by pharmaceuticals is frequently caused by lapses in behavior, and not by technological deficiencies (Chaudhary, 2019). Focusing on employee capability, motivation as well as opportunity, the model gives organizations a means through which sustainability intentions can be translated into quantifiable outcomes. In practice, the model advocates

pharmaceutical companies to consider bundled GHRM systems to integrate training, incentives, and participatory systems, and thus develop ERB and OCBE. GHRM requirements can be incorporated into environmental policies to bolster compliance systems by the policymakers and regulators. On the whole, the research is relevant to GHRM literature in that it provides a behaviorally based sector-specific model that explains the processes through which HR practices and environmental performance are inter-related. The proposed model can be expanded into other empirical studies conducted in the future to ascertain the relationships postulated in the study and determine moderating factors that influence behavioral outcome in pharmaceutical organizations.

Data Availability Statement

No new datasets were generated or analyzed during the current study. This article is an integrative review based entirely on previously published literature and secondary sources, which are cited in the References section.

Declaration of Conflicting Interests

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