

AMO-Based Green HRM Practices, Environmentally Responsible Behaviour, and Environmental Performance: Evidence from India's Pharmaceutical Industry

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Abstract

This research examined the association of AMO-based Green Human Resource Management practices with environmentally responsible behaviour and perceived organisational environmental performance in India's pharmaceutical sector. The study used the ability-motivation-opportunity framework to distinguish among ability-enhancing, motivation-enhancing, and opportunity-enhancing green HR practices. Data was collected from 565 employees from different pharmaceutical firms in Himachal Pradesh, India. Validated multi-item scales were taken from Tang et al. (2018), Saeed et al. (2019), and Montabon et al. (2007) were used. The data was analysed using CBSEM in AMOS 27. The findings show that all three AMO dimensions are positively associated with environmentally responsible behaviour. Environmentally responsible behaviour is also positively associated with perceived organisational environmental performance and mediates the relationship between AMO-based Green HRM practices and perceived environmental performance within the tested cross-sectional SEM model. AMO practices explain 37.9% of the variance in environmentally responsible behaviour, and the full model explains 38.0% of the variance in perceived organisational environmental performance. The study contributes context-specific evidence from Indian pharmaceutical manufacturing and highlights employee behaviour as a key pathway linking Green HRM practices with environmental performance.

Keywords: Green Human Resource Management, environmentally responsible behavior, organisational environmental performance, pharmaceutical industry

Introduction

Industrial organisations increasingly face pressure to align economic growth with ecological sustainability. The pharmaceutical industry is central to public health, but its production and product life cycle raise environmental-management concerns related to resource use, energy consumption, effluent control, and regulated waste streams (Kümmerer & Hempel, 2010). India's pharmaceutical sector is globally significant for generic medicines, exports, and domestic health care, and Himachal Pradesh is an important manufacturing cluster within it. The Himachal Pradesh State Pollution Control Board's responsibilities for pollution control, water-quality monitoring, trade-effluent regulation, and hazardous-waste management underline environmental management as a major governance concern in the region (HPPCB, 2022). Yet environmental performance in such contexts cannot be understood through technology, compliance systems, or regulation alone. It also depends on everyday employee conduct, conservation of resources, waste reduction, risk reporting, and participation in green initiatives. Green Human Resource Management (GHRM) has emerged as the organisational mechanism for embedding environmental objectives into recruitment, training, performance management, rewards, and employee involvement (Jackson et al., 2011; Renwick et al., 2013), and research on employee green behaviour suggests that such behaviours support environmental management when employees are enabled by appropriate HR systems (Boiral & Paillé, 2012; Paillé & Boiral, 2013).

The ability–motivation–opportunity (AMO) framework offers a valuable lens for this pathway. Ability-enhancing practices form environmental awareness and skills. Motivation-enhancing practices foster appreciation of environmental responsibility through appraisal, recognition, and reward. Opportunity-enhancing practices create participatory channels for environmental improvement. Prior research has applied AMO logic to Green HRM and employee green behaviour across hospitality, manufacturing, education, and service settings (Dumont et al., 2017; Fawehinmi et al., 2020; Tang et al., 2018), and to affective commitment and firm performance in broader Indian samples (Kundu & Gahlawat, 2018). More recently, AMO-disaggregated Green HRM has been linked to environmental citizenship behaviour in a Malaysian university (Anwar et al., 2020) and to commitment and environmental behaviour in South Asian pharmaceutical sector (Hossain et al., 2026). None of these studies, however, addresses Indian pharmaceutical manufacturing specifically. The current study examines the link between AMO-based GHRM practices, environmentally responsible behaviour (ERB), and perceived organisational environmental performance (OEP) among employees in the Baddi–Barotiwala–Nalagarh corridor. It asks how ability-, motivation-, and opportunity-enhancing green HR practices relate to ERB, and whether ERB mediates the relationship between these practices and perceived OEP. Its contribution lies in contextual evidence from the Indian pharmaceutical manufacturing cluster that illuminates the behavioural pathway through which HR practices may be tied to environmental performance.

2. Review of Literature and Theoretical Background

2.1 Green Human Resource Management: Conceptual Foundations

GHRM is the integration of environmental issues into HRM practices like recruitment, training, performance management, reward management, and employee involvement (Jackson et al., 2011; Renwick et al., 2013). Its central premise is that environmental management succeeds only when employees can perform, are motivated to perform, and are supported and involved by the organisation. Daily and Huang (2001) were among the first to identify HR-related factors relevant to environmental management, including higher management support, training, empowerment, teamwork, and rewards. Subsequent reviews consolidated GHRM as a distinct field and showed that AMO-related mechanisms are typically used to interpret environmental HR practices (Renwick et al., 2013; Amrutha & Geetha, 2020; Benevene & Buonomo, 2020). Empirical work has since broadened across national contexts: Jabbour et al. (2010) showed HRM plays different roles across stages of environmental-management maturity, Chaudhary (2019) established a positive relationship between Green HRM and both task-related and voluntary green employee behaviour in Indian automobile firms, and Mittal and Kaur (2023) showed that leadership context moderates the GHRM–environmental-performance relationship. Despite this growth, Indian pharmaceutical manufacturing, with its environmentally sensitive processes and regulated waste streams, remains underrepresented.

The relevance of AMO-based HR systems to Indian organisational settings is independently supported outside the Green HRM literature. Kundu and Gahlawat (2018), sampling 563 employees across 204 Indian organisations, found ability, motivation, and opportunity-enhancing HR practices each positively associated with affective guarantee and firm performance, with commitment fully mediating the opportunity–performance link and partially mediating the ability- and motivation–performance links evidence that AMO-based HR logic operates meaningfully under Indian managerial conditions, including high power distance, even without an environmental focus. In the South Asian pharmaceutical sector specifically, Hossain et al. (2026) found that Green HRM practices in Bangladeshi pharmaceutical firms have a positive association with employee commitment and environmental behavior. Commitment partially mediates this relationship, and organizational culture moderates it. Together these studies confirm that AMO-type HR mechanisms are culturally applicable in India and behaviourally consequential in pharmaceutical settings elsewhere in South Asia, but neither addresses the Indian pharmaceutical sector with an AMO-disaggregated Green HRM lens the gap this study fills.

2.2 Ability–Motivation–Opportunity Framework and Green HRM

The AMO framework explains how HR systems shape employee behaviour by developing capability, strengthening motivation, and creating opportunities for participation. In Green HRM, ability-enhancing practices include environmental training and skill development. Motivation-enhancing practices include green appraisal, recognition, and rewards, and opportunity-enhancing practices include

employee involvement, suggestion systems, and green teams. Tang et al. (2018) developed and validated the Green HRM practices scale. This scale is used as the basis for measurement here. Prior studies support the relevance of AMO-based GHRM to employees' green behavior. Dumont et al. (2017) found Green HRM shaped in-role and extra-role green behaviour through psychological green climate; Fawehinmi et al. (2020) found environmental knowledge mediated the Green HRM–employee green behaviour link among Malaysian academics. Nasir et al. (2023) found the association between Green HRM among the Pakistani pharmaceutical employees' pro-environmental behaviour directly and through green commitment. Rizvi and Garg (2021) linked Green AMO, transformational leadership, and green culture to environmental performance in Indian oil and gas firms, and Ma and Wang (2024) showed green innovation behaviour emerges through varying configurations of ability, motivation, leadership, and support. Closest to the present design, Anwar et al. (2020) disaggregated Green HRM into competence-building, motivation-enhancing, and involvement practices and found all three positively predicted organisational citizenship behaviour for the environment, which in turn mediated the link to university environmental performance treating employee behaviour as the proximal mechanism, as this study does, though in higher education rather than manufacturing. Kundu and Gahlawat (2018) further showed the three AMO dimensions are not interchangeable, varying in their relative association with outcomes within the same sample reinforcing the case for treating AMO as three distinguishable mechanisms. Accordingly, AMO provides the primary lens here for testing whether ability, motivation, and opportunity-enhancing Green HRM practices relating to ERB. This can be conceptualised as the behavioural pathway linking AMO-based Green HRM to perceived OEP.

2.3 Environmentally Responsible Behaviour(ERB)

Environmentally Responsible Behaviour (ERB) refers to employee actions that reduce organisational environmental impact and support sustainability goals, encompassing related constructs such as employee green behaviour, pro-environmental behaviour, and organisational citizenship behaviour for the environment. Here ERB is used inclusively, covering both required and voluntary environmentally relevant actions. Boiral and Paillé (2012) identified three dimensions of such behavior. Eco-initiatives, eco-civic engagement, and eco-helping showing that it spans compliance as well as proactive, cooperative, and improvement-oriented action. The in-role/extra-role distinction matters for Green HRM research: in-role ERB includes waste-segregation compliance, safety and disposal protocols, and risk reporting, while extra-role ERB includes voluntary suggestions and encouraging colleagues to conserve resources. Prior work shows employee environmental behaviour is shaped by individual knowledge and values as well as organisational conditions such as leadership, green climate, training, recognition, and participation opportunities (Fawehinmi et al., 2020; Kim et al., 2017).

ERB is central to this study as the behavioural link between Green HRM and environmental performance. HR practices are unlikely to improve environmental

outcomes automatically, but more likely to matter when they change how employees work, conserve resources, report risks, and participate in improvement. Paillé et al. (2014) found organisational citizenship behaviour for the environment mediated the strategic-HRM–environmental-performance relationship, and this logic has since been confirmed within an AMO-based Green HRM framework specifically: Anwar et al. (2020) found such behaviour mediated the relationship between all three AMO-based Green HRM dimensions and university environmental performance. Other studies similarly point to employee behaviour, commitment, knowledge, and psychological climate as connecting mechanisms (Dumont et al., 2017; Nisar et al., 2021), supporting study's treatment of ERB as a mediating pathway between AMO-based Green HRM and perceived OEP.

2.4 Organisational Environmental Performance

Organisational Environmental Performance (OEP) refers to the extent to which an organisation reduces environmental harm and improves environmental-management outcomes such as waste reduction, resource efficiency, pollution prevention, compliance, recycling, and incident reduction. It has been measured through both perceptual indicators (employee or manager assessments) and documentary indicators (corporate reports, disclosures, certification, emissions and waste data, or audit outcomes). Montabon et al. (2007) examined environmental-management practices and firm performance using corporate-report data, underscoring that environmental performance is multidimensional. Because the present study relies on employee survey data rather than independent audit records, OEP is interpreted as *perceived* organisational environmental performance, a distinction that matters because perceptual measures allow comparison across respondents and firms but may be affected by social desirability and common method bias. This measurement strategy mirrors recent South Asian pharmaceutical-sector research: Hossain et al. (2026) similarly relied on perceptual employee-survey data and cautioned that findings reflect employee perceptions rather than objective outcomes, a stance this study adopts as well. The study therefore examines whether AMO-based Green HRM is associated with perceived OEP through the behavioural pathway of ERB.

2.5 Theoretical Integration: AMO as the Primary Framework

AMO is the study's primary theoretical foundation because it directly addresses how different types of Green HRM practice relate to employee environmentally responsible behaviour: ability-enhancing practices build knowledge and skills, motivation-enhancing practices strengthen willingness to act, and opportunity-enhancing practices provide participatory channels. Other theories serve only as supporting lenses. Social Exchange Theory (Blau, 1964) helps explain why recognition and organisational support encourage discretionary environmental behaviour, as employees reciprocate organisational investment. The Resource-Based View (Barney, 1991) suggests employees' environmental knowledge and routines can form part of a firm's human-capital resources, though competitive advantage is not directly tested here. Institutional Theory situates Green HRM within the regulatory, market, and

stakeholder pressures facing pharmaceutical firms. Two further perspectives are noted as complementary rather than competing lenses. Organizational Support Theory (Eisenberger et al., 1986) extends the Social Exchange logic above, proposing that employees who perceive genuine organisational investment through credible training, recognition, and participation develop stronger attachment to organisational goals, including environmental ones. Hossain et al. (2026) applied this jointly with Social Exchange Theory to explain why Green HRM related to both commitment and environmental behaviour in South Asian pharmaceutical firms. Separately, Meng et al. (2026) integrate the Resource-Based View and Dynamic Capabilities Theory within a stimulus–organism–response (S-O-R) framework, in which leadership commitment is the organisational stimulus, HR-embedded psychological states are the organismic mechanism, and employee behaviour is the response preceding firm performance. This S-O-R logic is structurally analogous to the present treatment of AMO-based Green HRM as antecedent, ERB as behavioural mechanism, and perceived OEP as outcome, and is noted as a supporting frame consistent with, rather than a substitute for, AMO as the primary foundation.

2.6 Research Gaps and the Present Study's Positioning

Three gaps remain in this literature. First, most empirical work concerns hospitality, education, automobile, and general manufacturing or service settings, leaving Indian pharmaceutical manufacturing underrepresented. Existing South Asian study by Nasir et al. (2023) on Pakistani and Hossain et al. (2026) on Bangladeshi pharmaceutical employees confirms Green HRM's relevance to the sector without addressing the Indian context. Second, the mediating role of ERB between AMO-based Green HRM and perceived OEP needs further examination: prior studies point to behaviour, commitment, knowledge, or climate as connecting mechanisms (Paillé et al., 2014; Nisar et al., 2021), but the AMO–ERB–OEP pathway remains under-examined in Indian pharmaceutical manufacturing. Third, many studies treat Green HRM as a single construct where it has been disaggregated, the relative strength of the three AMO dimensions has varied by context. Kundu and Gahlawat (2018) found ability- and motivation-enhancing practices more strongly associated with firm performance than opportunity-enhancing practices in a general Indian sample, while Anwar et al. (2020) found all three significantly, though not equally, associated with environmental citizenship behaviour in a university setting. The AMO framework lets this study distinguish the three practice types and test whether they relate differently to ERB, contributing context-specific evidence from the Baddi–Barotiwala–Nalagarh pharmaceutical corridor on whether ERB functions as the behavioural pathway between AMO-based Green HRM and perceived OEP.

3. Conceptual Framework and Hypotheses

AMO is the conceptual framework, which proposes that HR practices shape employee behaviour by developing ability, strengthening motivation, and creating opportunities for participation. Here these three dimensions are applied to Green HRM practices to explain environmentally responsible behaviour among pharmaceutical-manufacturing employees. Ability-enhancing green HR practices such as training, awareness-building,

and skill development help employees understand environmental issues and perform environmentally relevant tasks, such as waste handling, resource conservation, chemical safety, effluent-related procedures, and compliance. Employees who receive such training are more likely to possess the knowledge and competence to recognise environmental risks and act responsibly.

H1: Ability-enhancing Green HRM practices are positively associated with environmentally responsible behaviour.

Motivation-enhancing green HR practices like appraisal, recognition, and reward mechanisms incorporating environmental criteria signal that environmentally responsible conduct is valued and consequential (Renwick et al., 2013; Tang et al., 2018). In pharmaceutical manufacturing, where compliance failures carry regulatory and reputational consequences, recognising and rewarding environmental conduct may help employees see it as a legitimate part of their role rather than an unrewarded extra burden.

H2: Motivation-enhancing Green HRM practices are positively associated with environmentally responsible behaviour.

Opportunity-enhancing green HR practices include green suggestion systems, environmental committees, and cross-functional involvement give employees a structured voice in environmental decision-making. Renwick et al. (2013) note that involvement-based practices let employees apply operational knowledge management may not otherwise access, particularly relevant where production, quality-control, and laboratory staff have direct exposure to environmental risks and inefficiencies.

H3: Opportunity-enhancing Green HRM practices are positively associated with environmentally responsible behaviour.

Beyond their individual associations with ERB, the three AMO dimensions are theorised to matter for environmental outcomes primarily through their effect on what employees actually do. Boiral and Paillé (2012) and Paillé et al. (2014) argue that organisational citizenship behaviour for the environment is the behavioural channel through which formal HR and environmental-management systems translate into improved outcomes, rather than producing such outcomes directly. Consistent with this logic, ERB resource conservation, waste reduction, risk reporting, and participation is expected to relate positively to perceived OEP.

H4: Environmentally responsible behaviour is positively associated with perceived organisational environmental performance.

If ERB is the behavioural channel through which HR practices influence environmental outcomes, AMO-based Green HRM practices should relate to perceived OEP primarily, or exclusively, through their effect on ERB rather than through any direct organisational signal. This is consistent with prior evidence that employee-level mechanisms, organisational citizenship behaviour for the environment (Paillé et al., 2014), green commitment (Nasir et al., 2023), and green psychological climate (Dumont et al., 2017) connect Green HRM with environmental performance.

H5: Environmentally responsible behaviour mediates the relationship between AMO-based Green HRM practices and perceived organisational environmental performance.

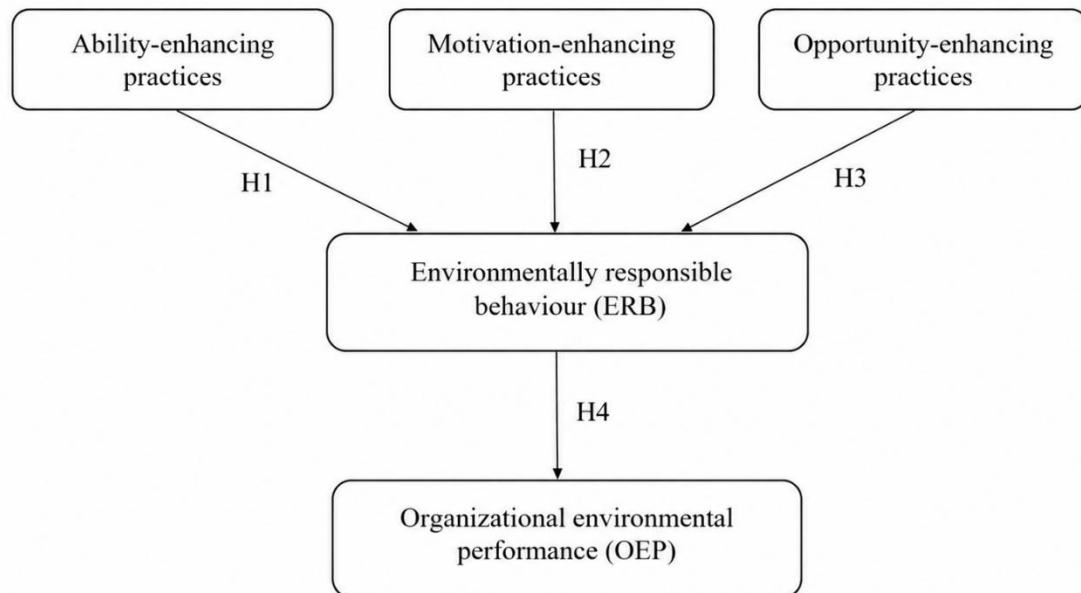


Figure 1. Conceptual Framework: Pro-Environmental AMO Practices, Environmentally Responsible Behaviour, and Organizational Environmental Performance

4. Methodology

4.1 Research Design

The research study used a positivist, deductive, quantitative cross-sectional design. Hypotheses were derived from the AMO framework and tested against survey data from pharmaceutical-industry employees. Because the study involves multiple latent constructs with simultaneous relationships and requires accounting for measurement error, covariance-based structural equation modelling (CB-SEM) was used.

4.2 Study Area, Population, and Sampling

The research was conducted in the pharmaceutical industrial corridor of Himachal Pradesh, India. The target population comprised employees of pharmaceutical manufacturing firms which included production workers, quality control and laboratory staff, supervisors, HR professionals, and middle management. A multistage sampling procedure was used: firms were selected from industrial directories and cluster-level data and contacted for permission, after which questionnaires were distributed across functional areas and hierarchy levels. Participation was voluntary, anonymous, and for academic purposes only. Of 687 questionnaires distributed, 609 were returned (89.3% return rate), and 565 valid responses remained after screening for incompleteness and irregular response patterns. The sample was not intended to be fully random across the BBN corridor but is considered sufficient for CB-SEM and representative across functions, levels, and firm size.

4.3 Measures and Scale Adaptation

All constructs were measured on 5-point Likert scales. Three AMO-based Green HRM dimensions — ability (AEP), motivation (MEP), and opportunity (PE_OEP) enhancing practices were adapted from Tang et al. (2018). ERB items were adapted from established pro-environmental behaviour scales, including Saeed et al. (2019). Perceived OEP items were adapted from Montabon et al. (2007), covering waste reduction, resource efficiency, compliance, recycling, and environmental-management outcomes. The questionnaire was contextualised for pharmaceutical manufacturing substituting generic environmental references with ones specific to training, waste handling, resource conservation, participation, and compliance while preserving the theoretical meaning of the original constructs.

4.4 Analytical Approach and Bias Control

Data were analysed in SPSS 27 and AMOS 27 through data screening, descriptive statistics, exploratory and confirmatory factor analysis, and structural equation modelling. Reliability was assessed via Cronbach's alpha and composite reliability; convergent validity via average variance extracted; and discriminant validity via the Fornell–Larcker criterion. Mediation was tested using bias-corrected bootstrapping (5,000 resamples, 95% CIs). Common method bias was addressed procedurally. Anonymity, voluntary participation, and separated construct sections were created. Statistically, Harman's single-factor test showed the first unrotated factor explained 32.445% of variance, below the 50% threshold. Because all core variables came from the same respondents, however, common method variance cannot be fully ruled out, and mediation findings are interpreted as theoretically consistent indirect associations rather than definitive causal evidence. No personally identifiable information was collected, and data were analysed only in aggregate.

5. Results and Findings

5.1 Sample Profile

Respondents were 65.7% male and 34.3% female, Most were aged 21–35, full-time, and had less than five years of organisational tenure. Participants were predominantly young (92.4% aged 21–35), reflecting the sector's reliance on a younger workforce, and 99.1% worked in domestically owned Indian private-sector firms. Regarding firm size, 42.3% worked in firms with $\geq 1,000$ employees and 36.1% in firms with 500–999 employees. Most respondents (89.4%) were full-time, and 77.5% had fewer than five years of tenure, indicating the high workforce mobility characteristic of the BBN cluster.

5.2 Measurement Model: Reliability and Validity

All constructs displayed satisfactory internal consistency (Cronbach's $\alpha \geq 0.877$) and composite reliability (CR ≥ 0.877). AVE values exceeded 0.50 for all constructs, confirming convergent validity, and MSV values were lower than AVE for all constructs, supporting discriminant validity further confirmed by the Fornell–Larcker criterion.

Table 1 presents full reliability and validity statistics; Figure 2 presents the AMOS measurement model with factor loadings.

Table 1. Construct Reliability and Validity

Construct	CR	**Cronbach's α **	*AVE** *	*MSV** *	*MaxR(H)**
AEP	0.877	0.877	0.640	0.273	0.878
MEP	0.899	0.899	0.641	0.256	0.900
PE_OEP	0.884	0.884	0.604	0.304	0.885
OEP	0.911	0.946	0.631	0.426	0.912
ERB	0.946	0.911	0.595	0.426	0.947

Note: CR = Composite Reliability; AVE = Average Variance Extracted; MSV = Maximum Shared Variance; MaxR(H) = Maximum Reliability. AEP = Ability-Enhancing Practices; MEP = Motivation-Enhancing Practices; PE_OEP = Opportunity-Enhancing Practices; OEP = Organizational Environmental Performance; ERB = Environmentally Responsible Behaviour.

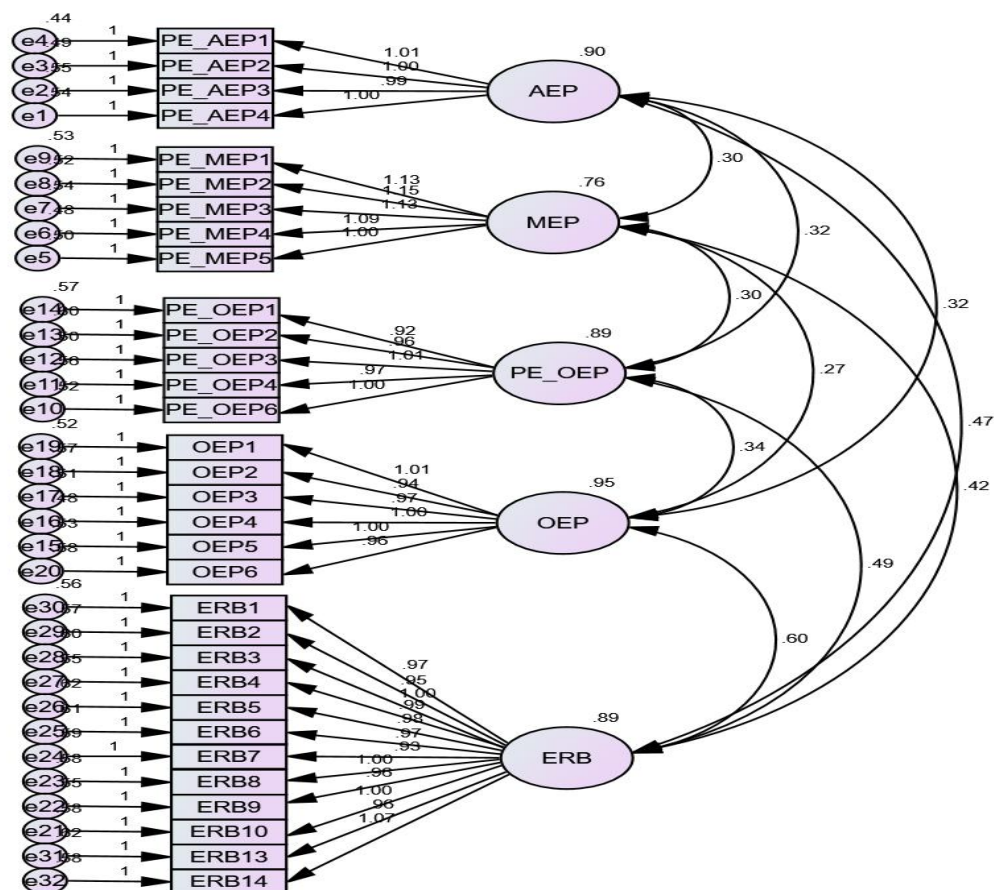


Figure 2. AMOS Confirmatory Factor Analysis (CFA) Measurement Model with Standardised Factor Loadings

5.3 Measurement Model Fit

The CFA measurement model demonstrated excellent fit as $\chi^2/df = 1.075$ (threshold $\leq$

5.4 Structural Model and Hypothesis Testing

Figure 1 is a path diagram of a structural equation model. It includes five latent variables: ERB, AEP, MEP, OEP, and PE_OEP, each represented by a circle. Observed variables are represented by rectangles. Standardized path coefficients are shown on the arrows. Error variances are shown in circles next to the observed variables.

- ERB Latent Variable:**
 - Observed variables: ERB14, ERB13, ERB10, ERB8, ERB9, ERB7, ERB6, ERB5, ERB4, ERB3, ERB2, ERB1.
 - Path coefficients: ERB14 (1), ERB13 (1), ERB10 (1), ERB8 (1), ERB9 (1), ERB7 (1), ERB6 (1), ERB5 (1), ERB4 (1), ERB3 (1), ERB2 (1), ERB1 (1).
 - Error variances: e32 (.57), e31 (.62), e21 (.58), e23 (.58), e22 (.55), e24 (.59), e25 (.61), e26 (.62), e27 (.55), e28 (.60), e29 (.57), e30 (.56).
- AEP Latent Variable:**
 - Observed variables: PE AEP1, PE AEP2, PE AEP3, PE AEP4.
 - Path coefficients: PE AEP1 (1.00), PE AEP2 (.98), PE AEP3 (.98), PE AEP4 (.98).
 - Error variances: e4 (.45), e3 (.36), e2 (.43), e1 (.41).
- MEP Latent Variable:**
 - Observed variables: PE MEP1, PE MEP2, PE MEP3, PE MEP4, PE MEP5.
 - Path coefficients: PE MEP1 (1.13), PE MEP2 (.92), PE MEP3 (.92), PE MEP4 (.92), PE MEP5 (.92).
 - Error variances: e9 (.53), e8 (.42), e7 (.48), e6 (.49), e5 (.41).
- OEP Latent Variable:**
 - Observed variables: OEP6, OEP5, OEP4, OEP3, OEP2, OEP1.
 - Path coefficients: OEP6 (1.00), OEP5 (1.00), OEP4 (1.00), OEP3 (1.00), OEP2 (1.00), OEP1 (1.00).
 - Error variances: e20 (.58), e19 (.58), e18 (.58), e17 (.58), e16 (.58), e15 (.58).
- PE_OEP Latent Variable:**
 - Observed variables: PE_OEP1, PE_OEP2, PE_OEP3, PE_OEP4, PE_OEP6.
 - Path coefficients: PE_OEP1 (1.00), PE_OEP2 (1.00), PE_OEP3 (1.00), PE_OEP4 (1.00), PE_OEP6 (1.00).
 - Error variances: e14 (.57), e13 (.40), e12 (.40), e11 (.46), e10 (.43).
- Path Coefficients:**
 - ERB to AEP: .31
 - ERB to MEP: .32
 - ERB to OEP: .01
 - ERB to PE_OEP: .02
 - AEP to OEP: .67
 - MEP to OEP: .36
 - MEP to PE_OEP: .77
 - OEP to PE_OEP: .02
- Error Variances:**
 - e33 (.46)
 - e35 (.92)
 - e36 (.77)
 - e34 (.54)
 - e37 (.89)

Table 2. Structural Model Results

Hypothesised Path	Std. Estimate (β)	t-value	Decision
H ₁ : AEP $\rightarrow$ ERB	0.348	8.255***	Supported
H ₂ : MEP $\rightarrow$ ERB	0.322	7.791***	Supported
H ₃ : PE_OEP $\rightarrow$ ERB	0.393	9.154***	Supported
H ₄ : ERB $\rightarrow$ OEP	0.611	10.409***	Supported

H5a: AEP → OEP (direct)	0.011	0.263	Not Supported
H5b: MEP → OEP (direct)	-0.019	-0.446	Not Supported
H5c: PE_OEP → OEP (direct)	0.019	0.421	Not Supported

Note: *** $p < .001$. AEP = Ability-Enhancing Practices; MEP = Motivation-Enhancing Practices; PE_OEP = Opportunity-Enhancing Practices; OEP = Organizational Environmental Performance; ERB = Environmentally Responsible Behaviour.

All three AMO dimensions significantly predicted ERB (H1–H3 supported, $p < .001$), and ERB strongly predicted OEP ($\beta = 0.611$, H4 supported). The direct effects of all three AMO dimensions on OEP were non-significant. AMO practices collectively explained 37.9% of variance in ERB ($R^2 = 0.379$), and the full model explained 38.0% of variance in OEP ($R^2 = 0.380$).

5.5 Mediation Analysis

Bootstrapped mediation analysis (5,000 resamples, 95% bias-corrected CIs) tested whether ERB mediated the relationship between AMO-based Green HRM practices and perceived OEP. As Table 3 shows, the indirect effects of all three AMO dimensions on perceived OEP through ERB were significant: 0.212 (95% CI [0.148, 0.286]) for ability-enhancing practices, 0.196 (95% CI [0.134, 0.271]) for motivation-enhancing practices, and 0.240 (95% CI [0.171, 0.322]) for opportunity-enhancing practices. None of the confidence intervals included zero. The direct effects of all three AMO dimensions on perceived OEP were non-significant once ERB was included, supporting a full-mediation structure within the tested model. The data was cross-sectional and self-reported.

Table 3. Bootstrapped Mediation Analysis (5,000 Resamples; 95% Bias-Corrected CI)

Path	Direct	Indirect	CI Low	CI High	p-value	Conclusion
AEP → ERB → OEP	0.011	0.212	0.148	0.286	< .001	Full Mediation
MEP → ERB → OEP	-0.019	0.196	0.134	0.271	< .001	Full Mediation
PE_OEP → ERB → OEP	0.019	0.240	0.171	0.322	< .001	Full Mediation

Note: Unstandardised coefficients are reported. Assessment of mediation was performed based on 5,000 bootstrap resampled and 95% bias-corrected confidence intervals. If the confidence interval does not contain zero, then the indirect effect is considered statistically significant. Due to cross-sectional survey data, mediation results should be interpreted as indirect relationships in the tested mediation model and not as causal evidence.

6. Discussion

6.1 AMO-Based Green HRM Practices and Environmentally Responsible Behaviour

That all three AMO dimensions relate positively to ERB supports the relevance of AMO-based Green HRM logic in this Indian pharmaceutical sample context-specific evidence, rather than a universal validation, that ability-, motivation-, and opportunity-enhancing practices are each linked to employee environmental behaviour. This parallels Anwar et al. (2020), who found all three AMO-based Green HRM dimensions positively associated with organisational citizenship behaviour for the environment among university academic staff, despite the considerable contextual difference from pharmaceutical manufacturing.

Among the three dimensions, opportunity-enhancing practices showed the highest standardised association with ERB ($\beta = 0.393$), followed by ability-enhancing ($\beta = 0.348$) and motivation-enhancing practices ($\beta = 0.322$). Participatory mechanisms include green committees, suggestion systems, reporting channels, cross-functional sustainability teams may be especially important in production settings where workers interact directly with materials, processes, and waste streams and so hold first-hand knowledge of environmental hazards and improvement opportunities. The positive ability-enhancing effect confirms that training in waste categorisation, chemical safety, resource management, and effluent-related compliance remains essential and cannot be assumed from general education. The positive but comparatively smaller motivation-enhancing effect suggests recognition and reward alone are unlikely to be sufficient without accompanying competence and participation opportunities remain consistent with AMO's logic of ability, motivation, and opportunity as complementary rather than separable levers.

This pattern is notable set against Kundu and Gahlawat (2018), who using a broad Indian sample spanning multiple industries found ability- and motivation-enhancing HR practices more strongly associated with firm performance than opportunity-enhancing practices, attributing the latter's weaker role to India's high power-distance, hierarchical culture, which makes participatory mechanisms harder to operationalise. The present study's contrasting pattern, in which opportunity-enhancing practices are the *strongest* rather than weakest predictor, may reflect a difference between general organisational performance and environmental performance specifically: employees in production, quality-control, and laboratory roles hold direct, experiential knowledge of environmental risks and inefficiencies that management may not otherwise observe, so participatory mechanisms may channel a form of operational knowledge that is uniquely relevant to environmental conduct even where participation is otherwise difficult to implement. This suggests the relative effectiveness of AMO dimensions may depend not only on national-cultural conditions, as Kundu and Gahlawat (2018) propose, but also on the specific behavioural domain targeted. The comparatively modest motivation-enhancing effect is also consistent with Hossain et al. (2026), who found an integrated bundle of Green HRM practices more strongly associated with employee environmental behaviour in the Bangladeshi pharmaceutical sector than any

single HR mechanism alone suggesting motivation-enhancing practices may exert their fullest effect when bundled with ability- and opportunity-enhancing mechanisms rather than evaluated in isolation.

6.2 Environmentally Responsible Behaviour and Perceived Organisational Environmental Performance

The positive association between ERB and perceived OEP was among the study's central findings, indicating a strong relationship between employees' environmental behaviour and their perception of organisational environmental performance. This supports the argument that environmental performance does not emerge from formal policy, technology, or compliance documentation alone but also from daily employee conduct regarding waste minimisation, resource conservation, risk reporting, procedural adherence, and participation in environmental programmes. This pathway is especially relevant to pharmaceutical production, where environmental risks and improvement opportunities are distributed across production, Quality Checking, packaging, laboratory, and waste-management roles, and where repeated small actions can meaningfully affect routine environmental management.

The finding should nonetheless be treated with caution as perceived OEP is measured through employee survey responses rather than independent audit records. It should not be read as evidence that ERB directly produced measurable environmental improvement. Employees reporting higher ERB also report stronger perceived organisational environmental performance. Future research should strengthen this relationship using multi-source data such as supervisor-rated ERB, firm-level environmental records, or third-party audit indicators. The finding is consistent with the foundational work of Boiral and Paillé (2012) and Paillé et al. (2014) establishing that voluntary employee environmental conduct meaningfully predicts organisational environmental outcomes, and closely parallels Anwar et al. (2020), who reported a comparable though somewhat smaller association ($\beta = 0.411$, $p < .001$) in a Malaysian university setting. The present study's larger coefficient ($\beta = 0.611$) may reflect the more operationally embedded nature of environmental conduct in pharmaceutical manufacturing, where employees' daily handling of materials, waste, and effluent creates a closer, more visible link between individual behaviour and environmental outcomes than in a university administrative setting.

6.3 ERB as a Mediating Behavioural Pathway

This full-mediation pattern is notable against comparable AMO-based HR mediation evidence. Kundu and Gahlawat (2018), testing affective commitment as mediator between AMO-enhancing HR practices and firm performance, found a mixed pattern. Commitment fully mediated the opportunity–performance relationship but only partially mediated the ability- and motivation–performance relationships, whose direct effects remained significant. Similarly, Hossain et al. (2026), testing employee commitment as a mediator between Green HRM and environmental behavior in Bangladeshi pharmaceutical firms, found that the direct effect of Green HRM remained significant ($\beta = 0.416$), alongside a significant indirect effect—partial rather

than full mediation. The present study's finding of full mediation across all three AMO dimensions simultaneously, with every direct path to perceived OEP rendered non-significant once ERB is included, is a more complete behavioural-channelling pattern than reported in these comparable studies. One plausible explanation is that perceived OEP, unlike general firm performance or self-reported environmental behaviour considered alone, may be a construct respondents evaluate largely on the basis of observed employee conduct rather than awareness of formal HR policy making it particularly dependent on the behavioural pathway. This interpretation is offered cautiously given the cross-sectional design. It is consistent with the stimulus–organism–response framing in which AMO-based Green HRM functions as organisational stimulus, ERB as organismic behavioural response, and perceived environmental performance as organisational outcome (Meng et al., 2026).

Because the direct paths from all three AMO dimensions to perceived OEP were non-significant while the indirect paths through ERB were significant, Green HRM practices appear more likely to relate to environmental performance when translated into employee behaviour extending this behavioural logic to an Indian pharmaceutical manufacturing context. However, because the study is cross-sectional, longitudinal, experimental, or time-lagged research is needed to confirm whether AMO-based practices lead to changes in ERB that subsequently improve environmental performance. For practice, this implies firms should not evaluate Green HRM merely by whether policies exist on paper: training, appraisal changes, reward systems, green committees, and participation platforms are unlikely to affect environmental outcomes until they change day-to-day behaviour, so firms should track behavioural indicators like participation in green initiatives, hazard reporting, waste-handling adherence, and supervisor or peer observations alongside HR policy implementation. This also clarifies why the three AMO dimensions function best as a unified system rather than standalone levers: opportunity-enhancing practices open channels for behaviour, motivation-enhancing practices strengthen commitment and effort, and ability-enhancing practices build the underlying competence, with all three mattering most when combined in employee conduct. ERB should therefore be understood as the behavioural link between HR systems and environmental performance, not a peripheral outcome of Green HRM.

7. Implications

7.1 Theoretical Implications

First, the finding that ability-, motivation-, and opportunity-enhancing Green HRM practices are each positively associated with ERB supports the relevance of AMO-based Green HRM logic in this setting, extending Anwar et al.'s (2020) similar pattern from a non-manufacturing setting. Second, the study highlights ERB as a behavioural pathway between Green HRM and perceived OEP, with full mediation across all three AMO dimensions providing a more complete behavioural-channelling pattern than the partial mediation reported by Kundu and Gahlawat (2018) for firm performance and Hossain et al. (2026) for environmental behaviour through commitment, suggesting the strength of this channelling may vary by outcome domain and mediating construct.

Third, the study provides sector-specific evidence from Indian pharmaceutical manufacturing, a context underrepresented relative to the hospitality, education, and general manufacturing settings that dominate AMO-Green-HRM scholarship (Anwar et al., 2020; Dumont et al., 2017; Fawehinmi et al., 2020), complementing South Asian pharmaceutical-sector evidence from outside India (Hossain et al., 2026; Nasir et al., 2023). By disaggregating the three AMO dimensions, the study offers a more precise account of how different HR mechanisms relate to ERB and perceived OEP.

7.2 Practical, Managerial, and Policy Implications

Pharmaceutical firms should treat Green HRM as an integrated system rather than a set of isolated activities. Ability-enhancing practices should strengthen employees' skills in waste management, resource conservation, chemical safety, and compliance reporting. Performance appraisal, recognition, and reward systems should reinforce environmental responsibility. Opportunity-enhancing practices deserve particular attention because they showed the strongest association with ERB. Firms should encourage green committees, suggestion systems, cross-functional sustainability teams, and risk-reporting channels to increase employee participation. The mediation finding further suggests firms should evaluate Green HRM through behavioural outcomes rather than policy implementation alone, tracking green-activity participation, hazard reporting, resource-conservation actions, and supervisor evaluations of environmental behaviour to bridge the sustainability-policy/production-practice divide. For policymakers and industry associations, environmental governance can be strengthened by complementing technical compliance with human-capital and behavioural mechanisms like sustainability-disclosure and cluster-level capacity-building frameworks. It could incorporate indicators for environmental training, participation, and role-based environmental responsibility, without replacing technical metrics, regulatory compliance, or objective monitoring. Because environmental performance in this sample related to AMO-based Green HRM practices only through employee behaviour, firms cannot assume that introducing green training, appraisal, or participation mechanisms will by itself improve outcomes. Consistent with Hossain et al. (2026) and Meng et al. (2026), behavioural indicators should be the primary measure of Green HRM effectiveness. HR policy adoption is necessary but not sufficient. Firms should assess whether Green HRM changes employees' day-to-day behaviour, not just whether policies exist. Otherwise, they may wrongly conclude that Green HRM is ineffective when the real issue is that policies have not yet translated into behavioural change.

8. Limitations and Future Research Directions

The study includes several limitations. First, the cross-sectional design does not establish causality, even though SEM tests theoretically specified relationships among latent constructs. Therefore, the mediation results can be interpreted as theoretically consistent associations rather than causal effects. In addition, Green HRM practices, ERB, and OEP were all self-reported by the same respondents, so common method

variance and social desirability bias cannot be completely ruled out. Second, OEP was measured using employees' perceptions rather than objective environmental performance. While this approach is common in organisational research, it limits conclusions about actual environmental improvement. Future studies can use employee surveys with supervisor ratings, HR records, environmental audits, and compliance or certification data. Third, the study focused on pharmaceutical firms in Himachal Pradesh, limiting the generalisability of the findings. Future research should imitate the model in other regions and industries, examine moderators such as green leadership, firm size, environmental management maturity, and regulatory pressure, and adopt longitudinal, multi-source, or mixed-method research designs.

The model could also be extended theoretically. Employee or affective commitment has been shown to mediate AMO-enhancing HR practices' relationship with firm performance (Kundu & Gahlawat, 2018) and environmental behaviour (Hossain et al., 2026) elsewhere; future research could test whether commitment operates as a parallel or sequential mediator alongside ERB. for instance, an AMO → commitment → ERB → OEP sequence to clarify whether the pathway identified here operates independently of, or partly through, employees' psychological attachment to their organisation. Organisational culture has been found to moderate the link between employees' psychological states and environmental or green-innovation behaviour in both Chinese manufacturing SMEs (Meng et al., 2026) and the Bangladeshi pharmaceutical sector (Hossain et al., 2026); given how environmental-management maturity and workplace norms vary across the domestic, multinational, and export-oriented firms in the Himachal Pradesh corridor, future research should test whether culture moderates the AMO–ERB or ERB–OEP relationships found here. Finally, Meng et al. (2026) show leaders' sustainability commitment is a significant antecedent of Green HRM practices; future research could examine whether top-management environmental commitment moderates the strength or authenticity of AMO-based Green HRM implementation in Indian pharmaceutical firms, given variation in ownership, scale, and regulatory exposure across the BBN corridor.

9. Conclusion

The research examined the relationship between AMO-based Green HRM practices, environmentally responsible behaviour, and perceived organisational environmental performance among pharmaceutical-sector employees in Himachal Pradesh. Drawing on the AMO framework, it distinguished ability-, motivation-, and opportunity-enhancing Green HRM practices and tested their association with employee environmental behaviour and perceived environmental performance. All three AMO dimensions were positively associated with ERB, with opportunity-enhancing practices showing the strongest standardised association, followed by ability-enhancing and motivation-enhancing practices. ERB was also positively associated with perceived OEP and mediated the relationship between AMO-based Green HRM practices and perceived environmental performance within the tested SEM model. These findings suggest Green HRM practices are more likely to matter for environmental performance when translated into employee behaviour; the full-mediation pattern found here in

which all three AMO dimensions relate to perceived environmental performance exclusively through ERB is more complete than the partial-mediation patterns reported in comparable AMO-based research on Indian firm performance (Kundu & Gahlawat, 2018) and South Asian pharmaceutical-sector environmental behaviour (Hossain et al., 2026), underscoring the centrality of employee conduct to this outcome domain.

The study contributes to Green HRM scholarship through context-specific evidence from Indian pharmaceutical manufacturing, a sector underrepresented relative to hospitality, education, and general manufacturing contexts (Anwar et al., 2020; Dumont et al., 2017) and complementary to recent South Asian pharmaceutical evidence from outside India (Hossain et al., 2026; Nasir et al., 2023). It further contributes by disaggregating Green HRM into ability-, motivation-, and opportunity-enhancing practices rather than a single construct, in line with the disaggregated approach validated by Kundu and Gahlawat (2018) in Indian organisational contexts and by Anwar et al. (2020) in AMO-based Green HRM research. Most importantly, it identifies ERB as a behavioural pathway linking HR practices with perceived OEP, with a full-mediation pattern more complete than in these comparable studies.

The findings carry practical relevance for pharmaceutical firms and industrial environmental governance. Compliance systems and technical controls alone should not be relied upon to improve environmental performance, but should be complemented by HR systems that train, recognise, and meaningfully involve employees in environmental improvement. As a cross-sectional study with self-reported data, however, the results should be read as evidence of theoretically consistent associations rather than causal effects, and future research should test the AMO–ERB–OEP pathway using longitudinal designs, multi-source data, and objective environmental-performance indicators. More broadly, the study points to the need for greater attention to employee behaviour in environmental-management research and practice: Green HRM can reinforce the behavioural dimension of organisational sustainability in a sector where environmental governance depends on both formal systems and daily workplace routines. Considered alongside recent evidence from university campuses (Anwar et al., 2020), South Asian pharmaceutical firms (Hossain et al., 2026; Nasir et al., 2023), and Chinese manufacturing SMEs (Meng et al., 2026), these findings join a growing body of research suggesting that the translation of HR systems into environmental performance is best understood as a behaviourally mediated, rather than directly mechanical, organisational process.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declaration of Conflicting Interests

The authors have no conflict of interest with respect to the research, authorship, and publication of this article.

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