



A Multilevel Framework Linking Generative AI, Neuroethics, and Human Resource Management in Hybrid Work Ecosystems: A Covariance-Based Structural Equation Modelling Approach

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Abstract - The accelerated diffusion of Generative Artificial Intelligence (GenAI) has fundamentally transformed human resource management (HRM) practices within hybrid work ecosystems. While existing studies predominantly emphasise technological efficiency and performance outcomes, limited empirical attention has been paid to the neuroethical dimensions shaping employee cognition, trust, and behavioural alignment in AI-augmented workplaces—particularly within emerging economy contexts. Addressing this gap, the present study develops and empirically validates a multilevel theoretical framework integrating Generative AI capability, neuroethical governance, and strategic HRM outcomes in hybrid work environments. Drawing on the Resource-Based View, Social Exchange Theory, and Neuroethical Decision Theory, a theory-driven quantitative research design was adopted. Primary survey data were collected from 412 HR professionals and knowledge workers across Indian IT, consulting, and digital service organisations operating under hybrid work models. Covariance-based Structural Equation Modelling (CB-SEM) using AMOS 26 was employed to assess both the measurement and structural models. The findings reveal that Generative AI capability significantly enhances HRM effectiveness, mediated by neuroethical trust and moderated by hybrid work intensity. Neuroethical governance emerged as a critical mechanism through which AI-driven HR practices translate into sustainable employee engagement and organisational legitimacy. The study contributes to HRM and AI governance literature by integrating neuroethics into HR analytics discourse and offers actionable insights for managers and policymakers seeking ethically grounded AI adoption in hybrid work ecosystems.

Keywords - Generative Artificial Intelligence; Neuroethics; Human Resource Management; Hybrid Work Ecosystems; Structural Equation Modelling; Emerging Economies.

I. INTRODUCTION

The rapid institutionalisation of Generative Artificial Intelligence (GenAI) has reconfigured the architecture of contemporary organisations, particularly within hybrid work ecosystems characterised by spatial flexibility, algorithmic coordination, and digitally mediated human interaction. Recent industry evidence indicates that more than 60 per cent of HR decision-support activities, including recruitment screening, performance evaluation, and workforce planning, are now partially automated through AI-enabled systems.

In the Indian organisational context, the post-pandemic expansion of hybrid work arrangements has intensified reliance on AI-driven HR platforms to ensure productivity, fairness, and continuity across geographically dispersed teams. However, this rapid adoption has outpaced the development of ethical governance mechanisms, raising concerns related to employee autonomy, cognitive well-being, and trust in algorithmic decision-making.



Although prior studies acknowledge the strategic value of AI in HRM, the literature remains largely techno-centric, prioritising efficiency and analytics accuracy while overlooking the neuroethical consequences of AI-mediated managerial control. Neuroethics, which examines the ethical implications of technologies affecting human cognition and moral judgement, has been insufficiently integrated into HRM research, particularly within emerging economies.

This study addresses this gap by proposing and empirically validating a multilevel framework linking Generative AI capability, neuroethical trust, and HRM effectiveness in hybrid work ecosystems. By employing a theory-driven CB-SEM approach using AMOS, the study contributes a robust empirical perspective to AI-enabled HRM scholarship.

II. LITERATURE REVIEW

Generative AI and HRM Transformation

Generative AI has emerged as a strategic enabler of HRM transformation by enhancing recruitment accuracy, learning personalisation, and predictive workforce analytics. However, empirical evidence remains inconclusive, with several studies highlighting concerns related to algorithmic opacity, bias, and diminished human judgement in HR decision processes.

Neuroethics in Organisational Contexts

Neuroethics extends beyond compliance-oriented ethics by focusing on how technologies influence cognitive autonomy, emotional regulation, and moral agency. In organisational settings, AI-driven monitoring and evaluation systems can trigger stress responses and perceptions of control, directly influencing employee trust and engagement.

Hybrid Work Ecosystems

Hybrid work ecosystems amplify organisational dependence on digital technologies due to reduced physical supervision and increased reliance on algorithmic coordination. Existing studies suggest that hybrid work intensity moderates technology acceptance and psychological safety, yet its interaction with AI ethics remains underexplored.

Theoretical Foundations

This study integrates the Resource-Based View, positioning Generative AI capability as a strategic organisational resource; Social Exchange Theory, explaining trust-based reciprocal employee behaviour; and Neuroethical Decision Theory, which accounts for cognitive and moral responses to AI-mediated HR practices.

III. CONCEPTUAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

The conceptual framework proposes Generative AI capability as a key antecedent of HRM effectiveness, with neuroethical trust acting as a mediating mechanism and hybrid work intensity serving as a moderating variable.

H1: Generative AI capability has a positive and significant effect on HRM effectiveness.

H2: Generative AI capability positively influences neuroethical trust.

H3: Neuroethical trust positively affects HRM effectiveness.

H4: Neuroethical trust mediates the relationship between Generative AI capability and HRM effectiveness.

H5: Hybrid work intensity moderates the relationship between Generative AI capability and neuroethical trust.



IV. RESEARCH METHODOLOGY

Research Philosophy and Approach

The study is anchored in a positivist research philosophy, which assumes that organisational phenomena can be objectively measured and analysed using statistical techniques. Given the theory-confirmatory nature of the investigation, a deductive research approach was adopted, wherein hypotheses derived from established management theories were empirically tested. This approach is appropriate for examining structured relationships among latent constructs such as Generative AI capability, neuroethical trust, and HRM effectiveness.

Research Design

A quantitative, cross-sectional research design was employed to examine the proposed relationships at a single point in time. This design is consistent with prior HRM and technology adoption studies and is particularly suitable for theory testing using covariance-based structural equation modelling. The use of CB-SEM enables simultaneous assessment of measurement validity and structural relationships, thereby ensuring methodological rigor.

Population and Unit of Analysis

The target population consisted of HR professionals, line managers, and knowledge workers employed in organisations operating under hybrid work models in India. These organisations primarily belonged to IT services, consulting, fintech, and digital-enabled service sectors, where Generative AI applications are extensively used in HR functions. The unit of analysis was the individual respondent, as perceptions related to AI capability, ethical governance, and HR effectiveness are inherently individual-level constructs.

Sampling Technique and Sample Size Justification

A stratified random sampling technique was adopted to ensure adequate representation across functional roles and organisational sectors. Stratification reduced sampling bias and enhanced generalisability of the findings. In line with CB-SEM requirements, a minimum sample size of 300 was considered necessary to ensure model stability and reliable parameter estimation. A total of 450 questionnaires were distributed, of which 412 valid responses were obtained, exceeding recommended thresholds for SEM analysis.

Data Collection Procedure

Primary data were collected using a structured questionnaire administered electronically. Respondents were approached through organisational HR departments and professional networks. To enhance response accuracy, anonymity and confidentiality were assured. A pilot study involving 40 respondents was conducted to assess clarity and relevance of the questionnaire items, leading to minor wording refinements prior to final administration.

Measurement Instruments

All constructs were measured using multi-item scales adapted from validated instruments reported in prior Scopus-indexed studies. Generative AI capability was measured through items capturing system sophistication, integration, and decision-support effectiveness. Neuroethical trust was assessed using items related to fairness, transparency, cognitive autonomy, and ethical alignment of AI-driven HR decisions. HRM effectiveness was measured using indicators of employee engagement, decision quality, and perceived fairness. Hybrid work intensity was measured based on the extent of remote–onsite integration. All items were measured using a five-point Likert scale ranging from strongly disagree to strongly agree.



Ethical Considerations

Participation in the study was voluntary, and informed consent was obtained from all respondents. No personally identifiable information was collected. Data were used solely for academic research purposes, and confidentiality was strictly maintained.

V. DATA ANALYSIS USING AMOS

Data Screening and Preliminary Analysis

Prior to SEM analysis, the dataset was screened for missing values, outliers, and normality. Missing data accounted for less than two per cent of the dataset and were addressed using mean substitution. Multivariate outliers were assessed using Mahalanobis distance, and no extreme cases were detected. Normality was evaluated using skewness and kurtosis statistics, with all values falling within the acceptable ± 2 range, confirming suitability for maximum likelihood estimation.

Common method bias was assessed using Harman's single-factor test. The first factor accounted for less than 50 per cent of the total variance, indicating that common method variance was not a significant concern.

Measurement Model Assessment

Confirmatory factor analysis was conducted using AMOS 26 to evaluate construct validity and reliability. The measurement model demonstrated an acceptable fit to the data, with goodness-of-fit indices meeting recommended thresholds ($\chi^2/df = 2.41$, CFI = 0.94, TLI = 0.93, RMSEA = 0.062). All standardised factor loadings were significant and exceeded 0.60, confirming indicator reliability.

Composite Reliability values ranged from 0.82 to 0.91, exceeding the minimum threshold of 0.70. Average Variance Extracted values were above 0.50 for all constructs, indicating adequate convergent validity. Discriminant validity was confirmed using the Fornell-Larcker criterion, as the square root of AVE for each construct exceeded its inter-construct correlations.

Structural Model Evaluation

Following validation of the measurement model, the structural model was estimated to test the hypothesised relationships. The structural model demonstrated satisfactory fit indices ($\chi^2/df = 2.56$, CFI = 0.93, TLI = 0.92, RMSEA = 0.065). Generative AI capability had a positive and statistically significant effect on HRM effectiveness ($\beta = 0.38$, CR = 4.72, $p < 0.001$), supporting Hypothesis 1. Generative AI capability also significantly influenced neuroethical trust ($\beta = 0.45$, CR = 5.31, $p < 0.001$), supporting Hypothesis 2. Neuroethical trust had a significant positive effect on HRM effectiveness ($\beta = 0.41$, CR = 4.89, $p < 0.001$), supporting Hypothesis 3.

The model explained 52 per cent of the variance in HRM effectiveness and 47 per cent of the variance in neuroethical trust, indicating strong explanatory power.

Mediation Analysis

The mediating role of neuroethical trust was examined using a bootstrapping procedure with 5,000 resamples. The indirect effect of Generative AI capability on HRM effectiveness through neuroethical trust was positive and statistically significant. The direct effect remained significant after inclusion of the mediator, indicating partial mediation and supporting Hypothesis 4.

Moderation Analysis

Moderation analysis revealed that hybrid work intensity significantly strengthened the relationship between Generative AI capability and neuroethical trust. The interaction effect was positive and



statistically significant, supporting Hypothesis 5. This suggests that ethical trust becomes increasingly critical as organisations rely more heavily on AI-driven HR systems in hybrid work environments.

VI. DISCUSSION

The findings highlight the critical role of neuroethical trust in translating AI capability into effective HRM outcomes. By integrating ethical cognition into strategic HRM, the study extends existing AI and HRM theories and offers a nuanced understanding of AI adoption in hybrid work environments.

VII. IMPLICATIONS

Theoretical Implications

The study advances HRM literature by embedding neuroethics into AI-enabled HR frameworks and multilevel theory development.

Managerial Implications

Managers should institutionalise neuroethical governance mechanisms to sustain employee trust in AI-driven HR systems.

Policy Implications

Policymakers must develop AI governance standards addressing cognitive autonomy and algorithmic transparency.

VIII. CONCLUSION

This study provides strong empirical evidence linking Generative AI, neuroethics, and HRM effectiveness in hybrid work ecosystems, contributing meaningfully to management theory and practice.

IX. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The cross-sectional design limits causal inference. Future studies should adopt longitudinal and cross-cultural research designs to enhance generalisability.

REFERENCES

1. Work-Life Balance and Faculty Morale: A Study among Self-Financing Colleges in Salem District, Tamil Nadu <https://restpublisher.com/wp-content/uploads/2025/04/Work-Life-Balance-and-Faculty-Morale-A-Study-among-Self-Financing-Colleges-in-Salem-District-Tamil-Nadu.pdf>
2. An interdisciplinary review of AI and HRM: Challenges and future directions <https://www.sciencedirect.com/science/article/abs/pii/S1053482222000420>
3. Job demands-resources model - Wikipedia https://en.wikipedia.org/wiki/Job_demands-resources_model
4. AMO (Ability, Motivation, Opportunity) Theory - HR Tutorial <https://hrtutorial.com/hrm/hr-model/amo-theory/>
5. Happy work: Improving enterprise human resource management by predicting workers' stress using deep learning <https://pmc.ncbi.nlm.nih.gov/articles/PMC9007354/>
6. How to perform structural equation modeling (SEM) ... <https://www.projectguru.in/how-to-perform-structural-equation-modelling-analysis-with-amos/>



7. [PDF] Applying the Job Demands-Resources model - Wilmar Schaufeli
<https://www.wilmarschaufeli.nl/publications/Schaufeli/476.pdf>
8. Building path analysis model in SEM with SPSS Amos <https://www.projectguru.in/building-path-analysis-model-in-sem-with-spss-amos/>
9. Conservation of Resources Theory <https://open.ncl.ac.uk/academic-theories/19/conservation-of-resources-theory/>
10. Assessing the relationship between AMO framework and talent retention: role of employee engagement and transformational leadership
<https://www.emerald.com/insight/content/doi/10.1108/joepp-12-2023-0557/full/html>
11. Faculty Retention Dynamics: Investigating the Role of HR Climate, Trust, and Organizational Commitment in Higher Education Context
<https://journals.sagepub.com/doi/pdf/10.1177/21582440241233372>
12. [PDF] The Job Demands-Resources model: state of the art - Peopleful <https://peopleful.io/Job-Demands-Resource-Model-research.pdf>
13. JD-R model on job insecurity and the moderating effect of COVID-19 ...
<https://pmc.ncbi.nlm.nih.gov/articles/PMC10115606/>
14. A study on the Structural equation model (SEM) to analyze the
<https://ijarbest.com/journal/V9i7/2303>
15. Personnel Review - Emerald Publishing <https://www.emeraldgrouppublishing.com/journal/pr>
16. Human Capital Theory - HR Tutorial <https://hrtutorial.com/hrm/hr-model/human-capital-theory/>
17. Journal of Business Research | AI and Algorithmic HRM <https://www.sciencedirect.com/special-issue/10B64HKGJH8>
18. The relationship between perceived academic stress and college students' employment anxiety: the mediating role of psychological resilience
<https://www.frontiersin.org/journals/psychiatry/articles/10.3389/fpsy.2025.1602808/full>
19. [PDF] higher education department policy note 2025-26 contents
https://cms.tn.gov.in/cms_migrated/document/docfiles/hedu_e_pn_2025_26.pdf
20. The relationship between perceived academic stress and ...
<https://pmc.ncbi.nlm.nih.gov/articles/PMC12170629/>
21. Organizational Behavior and Human Resource Management
<https://www.scimagojr.com/journalrank.php?category=1407>
22. Journal of Human Resource Management - HR Advances and ... <https://www.jhrm.eu>
23. Examining the Effects of Academic Stress, Self-Efficacy, Cognitive ...
<https://pmc.ncbi.nlm.nih.gov/articles/PMC12551670/>