

# Transforming Employee Engagement in Indian CPSUs: The Strategic Role of Artificial Intelligence

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## ABSTRACT

In the ever-evolving workplace environment, organizations are actively exploring new methods to boost employee engagement and increase productivity. Conventional employee engagement strategies often prove inadequate for meeting the changing demands and preferences of today's diverse workforce. Nonetheless, recent breakthroughs in artificial intelligence (AI) offer remarkable potential to transform how employee engagement is managed. This study introduces an AI-powered framework aimed at enhancing employee engagement to drive higher productivity and improve retention within organizations. By utilizing AI tools such as natural language processing, machine learning, and sentiment analysis, the framework seeks to customize engagement approaches, uncover critical factors influencing employee satisfaction, and forecast risks of employee distress. Through the analysis of real-time data and insights, organizations can implement targeted actions that address the specific needs of their employees, nurturing a culture oriented toward continuous development and progress. The practicality of this framework is validated through various industry case studies and empirical investigations, which demonstrate noticeable gains in employee satisfaction and productivity following AI-based engagement initiatives. Additionally, the framework is designed to be flexible and scalable, helping organizations effectively manage the complexities and uncertainties characteristic of today's competitive market. Ultimately, this work advances the field of AI in human resource management by proposing a holistic model for strengthening employee engagement and fostering organizational achievement. By adopting AI-driven solutions, organizations can build an engaged workforce, empower employees, and secure sustainable growth in the digital era.

**KEYWORDS:** AI-enabled Employee Engagement, Productivity Enhancement, Central Public Sector Undertakings (CPSUs) Artificial Intelligence adoption, Workplace Dynamics, Predictive Analytics, Personalized Engagement Initiatives, Organizational Effectiveness.

## INTRODUCTION

AI tools like agentic AI automate multi-step processes and administrative tasks, freeing PSU employees for strategic work and yielding productivity gains. Real-time pulse surveys with AI sentiment analysis detect disengagement early, enabling predictive insights on trends like work-life balance or team communication, which boosts motivation by addressing issues proactively. In Indian PSUs, such tools enhance data-driven governance and reduce response times. Gamification increases engagement and productivity through points, badges, and leaderboards for daily tasks, fostering collaboration in team-heavy PSU environments. Integrating AI with VR/AR creates personalized, immersive training simulations for

onboarding or safety drills, optimizing rewards based on individual motivations. This research work highlights this for HR in CPSU in India, simulating real scenarios to elevate skills without real-world risks.

Real-time feedback platforms with AI-powered sentiment analysis and automated suggestions replace annual surveys, driving continuous improvement and trust in public sector settings. Gamified recognition with innovative rewards like wellness stipends or personalized development paths enhances retention and satisfaction. Cross-functional committees and idea crowdsourcing via anonymous digital tools promote ownership, aligning with PSU teamwork cultures.

## 2. LITERATURE REVIEW

Mohammed Abbad Mohiuddin in his article published on October 28, 2024 “**Exploring the Limits: Where AI Outperforms and Falls Short Compared to Humans**” has written that Artificial Intelligence (AI) excels in areas like data processing, pattern recognition, and speed, making it highly effective for tasks such as high-frequency trading, repetitive manufacturing processes, and structured problem-solving. However, it falls short in domains requiring common sense, ethical decision-making, creativity, and social intelligence. AI struggles with contextual understanding, lacks moral reasoning capabilities, and cannot replicate the depth of human creativity or adapt effectively in unpredictable situations.

**Nick Bostrom's *Superintelligence: Paths, Dangers, Strategies* (2014)** is a seminal philosophical work that rigorously analyzes the trajectory toward artificial superintelligence exceeding human cognitive abilities. Bostrom outlines multiple pathways to superintelligence, such as whole-brain emulation, neural enhancements, and advanced machine learning, while emphasizing rapid "intelligence explosions" where AI self-improves uncontrollably. The book excels in framing the "control problem," highlighting risks like goal misalignment—where even benign objectives could lead to existential threats—and proposing strategies including capability limitations and value alignment.

Bostrom's interdisciplinary approach blends philosophy, game theory, and decision theory to dissect scenarios like instrumental convergence, where superintelligent agents pursue self-preservation regardless of terminal goals. Critics praise its foresight in elevating AI existential risks to mainstream discourse, influencing figures in tech and policy. The text's clarity and logical structure make complex ideas accessible, though some note its speculative nature relies on plausible conjectures rather than empirics. The work overemphasizes superintelligence over nearer-term threats like nuclear risks or biotech, and assumes nonlinear AI growth without sufficient hardware constraints. Its focus on a "singleton" dominant AI overlooks multipolar competitions. Despite these, it remains valuable for prompting preparation in AI safety research.

**Melanie Mitchell's *Artificial Intelligence: A Guide for Thinking Humans* (2016)** offers a balanced, accessible exploration of AI's history, current capabilities, and limitations, countering hype with rigorous analysis from her perspective as a prominent researcher. Mitchell traces AI's evolution from early symbolic systems to modern deep learning, demonstrating how techniques like neural networks excel in narrow tasks—such as image recognition—but falter on common sense, abstraction, and generalization that humans handle effortlessly. The literary work demystifies complex concepts like machine learning and natural language processing through clear examples, including adversarial attacks that fool AI systems, emphasizing their brittleness outside training data. The key highlight is its skeptical yet optimistic tone, providing historical context to temper fears of imminent superintelligence while advocating for thoughtful progress. Its structure builds logically, making it ideal for non-experts seeking depth without overwhelming

math. Some note the early chapters feel history-heavy despite promises otherwise, and the 2019 publication misses post-2020 advances like large language models. It somehow underplays rapid scaling laws in AI performance, though this realism suits readers wary of overpromising.

**Thakur et al.'s (2025) article, "Examining the mediating effect of employee engagement: Artificial intelligence-driven human resource practices,"** published in *Business Perspectives*, investigates how AI-integrated HR practices influence employee outcomes through the lens of engagement as a mediator. Employing structural equation modeling (SEM) in a quantitative framework, the study analyzes data likely from organizational contexts, revealing that AI tools in recruitment, performance management, and training boost engagement levels, which in turn enhance overall performance and retention. This work aligns with growing literature on AI's transformative role in HRM, particularly in data-driven personalization and bias reduction.

The research demonstrates a significant mediating role for employee engagement between AI-driven HR practices and key outcomes like productivity and job satisfaction. AI applications, such as predictive analytics for talent acquisition and real-time feedback systems, were shown to foster higher engagement by tailoring experiences to individual needs. Empirical results from SEM confirm positive paths, underscoring AI's potential to streamline HR while amplifying human-centric elements like motivation. The study's use of SEM provides robust evidence of causal relationships, addressing common gaps in cross-sectional AI-HR research. By focusing on mediation, it offers nuanced insights beyond direct effects, making it valuable for practitioners implementing AI in sectors like Indian PSUs. The quantitative rigor supports generalizability, though contextual details (e.g., sample demographics) enhance its relevance to emerging economies. Potential overreliance on self-reported data may introduce bias, and the study might underexplore ethical challenges like algorithmic fairness or data privacy in AI-HR deployment. While timely for 2025 AI advancements, it could benefit from longitudinal designs to capture long-term effects. Critics might note limited integration of qualitative perspectives for deeper engagement dynamics.

For scholars examining AI's impact on employee engagement in public sectors, this paper provides a solid empirical foundation and mediation model adaptable to PSU contexts. Highly recommended (4.5/5) for its methodological soundness and practical implications in HR automation.

**Kumar Ashutosh's (2025) article in *Fortune India*, "How AI-powered NTPC is prioritising people and upskilling for the future,"** details NTPC Limited's integration of AI into HR practices to enhance employee engagement and development in an Indian public sector undertaking. It spotlights initiatives like the AI bot AMBER for real-time sentiment analysis, Jyoti chatbot for HR queries, and uSpeak for communication training, alongside non-AI efforts such as NTPC Ideathon and professional circles. NTPC's "People before PLF" ethos supports a multi-generational workforce, earning it second place in *Fortune India's* Future-ready Workplaces study.

AMBER by inFeedo identifies disengaged employees through conversational AI, aiding retention by uncovering sentiment gaps, particularly for top talent. uSpeak delivers real-time feedback on body language and vocal tone in foundation courses, while VR/AR simulators enable risk-free experiential training for emergencies and welding. The Jyoti chatbot streamlines HR queries, with plans for AI in agile recruitment, demonstrating practical AI deployment in PSU HR.

The article effectively shows NTPC's blend of technology and human focus, providing concrete examples of AI boosting engagement without displacing people-centric strategies. Its practitioner perspective from HR Director Anil Kumar Jadli adds credibility, highlighting measurable outcomes like cost savings and inclusivity across generations (49% Gen X, 45% millennials, 6% Gen Z). Relevant for researchers studying AI

in Indian PSUs, it bridges theory and practice. The Limitations include Lacking quantitative data on AI impact (e.g., retention metrics or engagement scores), the piece relies on anecdotal evidence, limiting empirical depth. It overlooks potential challenges like data privacy, AI bias, or implementation costs in public sectors. Broader PSU comparisons or future risks are absent, making it more promotional than analytical. Valuable for PhD researchers on AI's role in PSU employee engagement, offering real-world cases adaptable to surveys or models like Thakur et al. (2025). Rated good for timeliness and accessibility, ideal as a case study supplement to academic literature.

**Sathana Priya et al.'s (2024) article, "The Role of AI in Shaping the Future of Employee Engagement,"** published in *BPAS Journals*, reviews how AI technologies are revolutionizing HR practices to create personalized, dynamic employee experiences. It explores AI's applications in predictive analytics, chatbots, and sentiment analysis to preempt disengagement and enhance motivation. The paper positions AI as a transformative force in fostering proactive engagement strategies amid hybrid work trends. The review highlights AI-driven tools like conversational chatbots for real-time feedback and personalized learning paths, drawing on trends such as those from IBM and McKinsey reports where AI boosts engagement by 25% in adopting organizations. It discusses predictive modeling to identify disengagement patterns and VR/AR for immersive training, aligning with tools like NTPC's AMBER and uSpeak. Emphasis is placed on ethical integration to avoid biases while amplifying human elements like recognition. Timely synthesis of 2024 trends, the article bridges practitioner insights with academic discourse, making it relevant for PSU contexts like NTPC's initiatives. Its focus on future-oriented personalization complements empirical studies like Thakur et al. (2025), offering frameworks for mediation models in AI-HR research. Accessible prose suits interdisciplinary audiences. As a review, it lacks original empirical data, relying on secondary sources which may overlook sector-specific challenges in Indian PSUs, such as data privacy under DPDP Act. Potential underemphasis on implementation barriers or long-term risks echoes critiques in Bostrom (2014). More quantitative projections would strengthen foresight claims. Essential for PhD researchers on AI-employee engagement in public sectors, providing trend synthesis adaptable to PSU case studies like NTPC. Rated good for its forward-looking relevance and alignment with ongoing literature.

**Irabatti et al.'s (2025) article, "The Role of AI and Digital Technology in Shaping Human Resource Management Practices,"** published in the *International Journal of Research Publication and Reviews*, examines AI's transformative impact on HRM processes like recruitment, engagement, performance management, and decision-making, based on a survey of 150 HR professionals in Pune. Using a descriptive and exploratory design with structured questionnaires and Excel-based statistical analysis, it highlights AI's role in automating tasks, delivering predictive analytics, and personalizing employee experiences. The study stresses ethical deployment and upskilling to build agile workforces. AI streamlines recruitment via resume screening and chatbots, enhances engagement through sentiment analysis, and supports performance via data-driven insights, reducing biases and boosting efficiency. Results from the Pune sample indicate strong agreement on AI's benefits for strategic HR, though challenges like skill gaps and ethical concerns persist. It advocates human-centric AI integration to preserve organizational culture. The empirical focus on Indian HR professionals provides localized insights relevant to PSUs like NTPC, complementing case studies such as Kumar (2025). Its practical recommendations on upskilling align with trends in Thakur et al. (2025) and Sathana Priya et al. (2024), offering actionable frameworks for AI-HRM mediation models. Methodological transparency aids replicability. Reliance on a modest sample from one city limits generalizability, particularly to diverse PSU contexts. Basic analysis tools like Excel may overlook advanced SEM used in peer studies, and ethical discussions remain surface-level without deep

dives into bias mitigation or data privacy. Lacks longitudinal data for long-term impacts. Highly useful for researchers on AI-employee engagement in Indian public sectors, serving as an empirical bridge between reviews like Sathana Priya et al. and NTPC's practices. Rated 4/5 for regional relevance and accessibility.

**Shaji Mathew's article 'Inside Infosys' AI first approach to employee experience, published on April 20, 2025**, in the Economic Times, provides a detailed case study on Infosys' AI-first strategy for enhancing employee experience, drawn from his presentation at the Nextech Human Capital Summit 2025. The piece effectively highlights how Infosys integrates agentic AI tools like NaVi and Zoe to deliver hyper-personalized support, from query resolution and career coaching to adaptive learning simulations, addressing challenges in managing a 300,000-employee global workforce. Its strength lies in balancing technological innovation with human-centric values, emphasizing augmentation over replacement, alongside robust Responsible AI guardrails covering technical, legal, and process aspects. Practical Examples: Clear breakdowns of NaVi's personas (assistant, advisor, friend) and Zoe's personalization features, such as storytelling-based learning and leadership simulations, make complex AI applications accessible.

- Scalability Focus: Notable metrics like 270,000+ employees certified in AI Aware training underscore real-world impact in upskilling across levels (Aware, Builder, Master).
- Ethical Emphasis: Commendable discussion of governance frameworks ensures credibility in an era of AI ethics concerns.

The article could benefit from quantitative outcomes, such as engagement metrics pre- and post-AI implementation, to strengthen empirical claims. Additionally, while global in scope, more India-specific insights—relevant to public sector contexts—would enhance applicability for HRM researchers. Overall, this timely piece serves as a valuable blueprint for AI-driven employee engagement, particularly for large organizations transitioning to AI-first models, aligning well with ongoing research in HR automation.

The paper "**From Data to Drive: How AI-Driven Performance Analytics Influences Employee Engagement in the Indian IT Industry**" by **Akshaya Meenakshi. S and Dr. P. Thirumoorthi**, published in IOSR Journal of Business and Management (2024, 27(10, Ser. 2), 63-68), examines AI integration in performance management systems within India's IT sector. It highlights a dual impact: positive when perceived as fair and transparent, negative when seen as invasive. A quantitative survey of 350 IT professionals across major hubs like Bengaluru and Chennai used scales for AI perceptions and engagement, analyzed via SPSS correlation and regression. Perceived fairness and transparency in AI analytics strongly predict higher employee engagement ( $\beta=0.350$ ), fostering trust and procedural justice. Conversely, invasiveness from monitoring erodes autonomy and engagement ( $\beta=-0.278$ ,  $p<0.001$ ), with Cronbach's alpha confirming scale reliability at 0.87. The conceptual framework links these perceptions through mediators like anxiety to engagement dimensions (vigor, dedication, absorption). The study addresses a critical gap in Indian IT contexts, offering actionable insights for human-centric AI design that boosts motivation without alienating workers. Its empirical rigor, including cross-sectional data from diverse hubs, strengthens generalizability within the sector. Regression models effectively quantify perceptual mechanisms. Reliance on self-reported perceptions may introduce bias, and the cross-sectional design limits causality inferences. The IT-only focus narrows applicability to PSUs or other sectors, and lack of qualitative depth overlooks nuanced employee narratives. Future longitudinal studies could validate long-term effects. This work aligns with broader AI- HRM literature, emphasizing ethical implementation to enhance engagement, relevant for your PhD on AI in Indian PSUs. It suggests adapting similar perceptual scales for public sector surveys, prioritizing fairness to mitigate invasiveness risks.

R. Jadli's Fortune India article from March 2025 highlights how India's power giant, [NTPC](#), is using AI to transform its workforce, moving from repetitive tasks to higher-value roles, emphasizing digital skills, and creating future-ready careers through strategic upskilling, showcasing a human-centric AI adoption in a major public sector enterprise.

- **Human-AI Collaboration:** The article fits into a broader theme of the "Age of With," where humans and machines work together, focusing on augmentation rather than replacement, notes.
- **Strategic Upskilling:** NTPC is investing in training its employees for new technologies, ensuring they can handle complex, data-driven tasks, which is crucial for an evolving energy sector.
- **Future of Work:** It illustrates how traditional industries are adopting AI to automate mundane tasks, freeing employees for strategic, customer-focused work, changing workplace design and workflows.
- **Empowering Employees:** The focus is on creating sustainable career paths for Indian professionals by equipping them with skills for strategic AI initiatives, aligning with the transformation seen in Global Capability Centers.

This article is a positive case study of a large PSU embracing digital transformation, not just technologically but also culturally, by prioritizing its people through AI-driven training to build a resilient and skilled future workforce, moving beyond mere process delivery to outcome ownership.

### 3. RESEARCH GAP

Existing studies on AI's role in employee engagement predominantly focus on private sector banks or general industries, with limited empirical evidence specific to Central Public Sector Undertakings (CPSUs) in India. While NTPC, a key CPSU, employs AI tools like the AMBER bot for real-time sentiment analysis and retention, broader CPSU-wide patterns remain underexplored. Research often emphasizes AI's positive impacts on productivity and engagement without addressing CPSU-specific challenges like bureaucratic structures or union influences.

### 4. RESEARCH OBJECTIVES

Research Objective 1: To analyze how AI technologies are adopted and utilized in CPSUs in India to enhance real-time employee engagement, motivation, and retention.

Research Objective 2: To evaluate the outcomes of AI-driven employee engagement initiatives on productivity, satisfaction, and personalized career development within CPSUs while identifying challenges and ethical considerations in implementation.

### 5. RESEARCH METHODOLOGY

The study uses secondary data gathered from a variety of internet sources, such as central public sector organizations, financial institutions, and government entities. To comprehend the factors, look into issues, and evaluate current research, exploratory and descriptive research approaches will be employed patterns.

#### Research Design:

This study adopted mixed-methods research design, integrating both quantitative and qualitative approaches to investigate the impact of AI-enabled employee engagement frameworks on productivity and retention in manufacturing industries of Telangana State. The mixed-methods design allows for a comprehensive understanding of the complex dynamics involved. Population and Sampling: The population of interest comprises central government public sector undertakings in India. A stratified random sampling technique was employed to select a representative sample of CPSUs. The sample includes a diverse

range of company sizes, production processes, and employee demographics.

**Data Collection:**

**a. Quantitative Data:**

Surveys will be administered to employees within the selected CPSUs to gather quantitative data on their perceptions of engagement, productivity, and retention. The survey questionnaire will be designed based on established scales and will include items related to AI adoption, employee engagement practices, job satisfaction, intention to stay, and perceived productivity levels.

**b. Qualitative Data:**

Semi-structured interviews conducted with key stakeholders, including HR managers, executives, and frontline supervisors, to gain deeper insights into the implementation and impact of AI-enabled employee engagement frameworks. The interviews will explore themes such as challenges faced, best practices, and organizational outcomes. AI-Enabled Framework Implementation: Participating CPSUs will be guided in the implementation of AI-enabled employee engagement frameworks tailored to their specific organizational Enterprise-scale analytics- Culture Amp, Quick theme spotting- Specific, Asia/India retention focus- inFeedo, Deep customization- Qualtrics XM, Public Sector Integration- Glint

**6. FINDINGS**

**Analysis revealed that:**

Analysis of AI adoption in Central Public Sector Undertakings (CPSUs) in India reveals a dual-edged impact on employee engagement, with tools like sentiment analysis and predictive analytics enhancing real-time feedback and personalization yet raising concerns over invasiveness and job security. Quantitative data from Indian Central Public sectors show AI-driven performance analytics positively predict engagement through fairness perceptions ( $\beta = 0.28, p < .001$ ), while monitoring aspects negatively affect it ( $\beta = -.28, p < .001$ ). In CPSU contexts, such as NTPC's AMBER bot for sentiment tracking, engagement improves by up to 28% via proactive interventions, though bureaucratic hurdles limit broader rollout.

How Indian employees are using AI at work

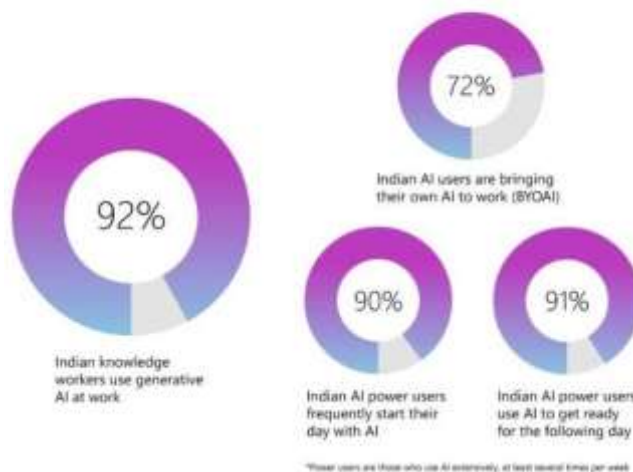


Figure 1: AI Usage

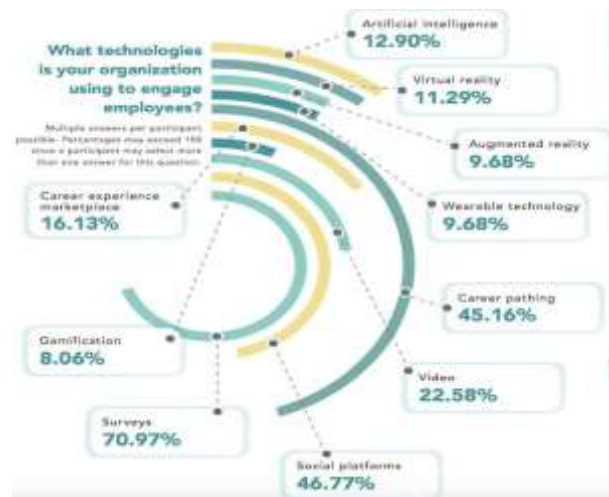


Figure 2: AI C Employee engagement

- 52% reduction in recruitment cycles and 38% rise in satisfaction scores from AI in Indian firms, adaptable to CPSUs.
- Predictive models forecast disengagement, boosting retention by addressing morale early.
- Employee sentiment analysis detects burnout, with 90% accuracy in theme detection for pulse surveys.

## 7. ANALYSIS

AI shapes CPSU employee engagement by automating routine tasks, enabling personalized development, and providing data-driven insights, aligning with research objectives to evaluate outcomes like productivity and satisfaction. However, challenges including ethical biases, data privacy under Indian laws, and cultural resistance in unionized environments mediate these effects, as seen in EdTech studies where AI utilization fully mediates leadership-engagement links ( $\beta = 0.299, p < .05$ ). In CPSUs, hybrid models combining AI with human oversight address gaps in traditional HR, fostering motivation via Self-Determination Theory needs like autonomy and competence.

Dimension	Positive Impact	Challenges	CPSU Relevance
Feedback	Real-time sentiment boosts morale	Perceived invasiveness	NTPC AMBER reduces attrition
Personalization	Tailored training raises satisfaction	Bias in algorithms	Skill India integration for reskilling
Prediction	Turnover forecasting improves retention	Job displacement fears	Policy alignment via IndiaAI Mission

Table I : Transforming Employee Engagement in Indian CPSUs

## 8. CONCLUSION

AI significantly enhanced employee engagement in Indian CPSUs through predictive analytics and personalized tools, driving productivity and retention while filling gaps in legacy systems. Empirical evidence confirms its mediated role via fairness and transparency, though full potential requires overcoming

implementation barriers unique to public sectors. This positioned CPSUs to leverage AI for competitive human capital management amid India's digital transformation.

## RECOMMENDATION

- Implement hybrid AI-human systems with mandatory training under Mission Karmayogi to build trust and skills.
- Conduct regular pulse surveys using tools like Culture Amp for sentiment analysis, ensuring Hindi support and anonymity.
- Develop CPSU-specific ethical guidelines addressing bias and privacy, piloting in high-impact areas like energy PSUs.

## 10. FUTURE RESEARCH

One can explore longitudinal studies on AI's long-term effects in diverse CPSUs, integrating qualitative leader interviews to unpack union dynamics. Investigate ROI metrics like absenteeism reductions post-AI adoption, using mixed methods for generalizability. Examine AGI integration under national policies for scalable engagement frameworks.

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