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A STUDY ON EMPLOYEE PERFORMANCE TRACKING IN AN ORGANIZATION USING ARTIFICIAL INTELLIGENCE

Koteswara Rao Vemavarapu
Assistant Professor, Faculty of Business
Bahrain Polytechnic Kingdom of Bahrain
koteswara.vemavara@polytechnic.bh

Dr. Shaik Mohammad Rafi
Faculty Department of Commerce & Management,
Acharya Nagarjuna University, Andhra Pradesh, India.

Prof. Puttapalli Arun kumar
Faculty of HRM,DCMS,Andhra university.
prof.pakumar @andhrauniversity.edu.in

Abstract

Artificial Intelligence (AI) is reshaping contemporary performance management by shifting employee evaluation from episodic, judgment-heavy appraisals to continuous, data-enabled assessment. This revised study examines how AI-based employee performance tracking influences performance quality, productivity, employee perception, trust, and implementation outcomes in organisational settings. The article integrates a structured review of recent scholarship and a quantitative survey of 150 respondents drawn from information technology, manufacturing, and service organisations. A five-point Likert-scale instrument was used to capture perceptions of AI usage, productivity enhancement, transparency, trust, and employee performance. The analytical framework includes descriptive statistics, reliability analysis, correlation analysis, paired-samples t-test, ANOVA, and regression analysis. The results indicate that AI-supported performance tracking is perceived as more effective than traditional appraisal mechanisms and that AI usage is positively associated with employee performance and productivity. Sectoral and experience-based differences are also observed, while transparency emerges as an important predictor of trust in AI-enabled HR systems. The findings support a balanced implementation model in which AI improves performance management efficiency while human oversight safeguards fairness, explainability, and employee acceptance.

Keywords: Artificial Intelligence, employee performance tracking, HR analytics, performance management, productivity, trust, transparency, regression analysis, ANOVA.

1. Introduction

Organisations increasingly rely on digital intelligence to strengthen productivity, streamline decision-making, and improve workforce accountability. Within human resource management, one of the most visible developments is the adoption of artificial intelligence for employee performance tracking. AI-enabled systems allow organisations to monitor work patterns, compile behavioural and output data, and generate performance insights in near real

time. As a result, performance management is moving away from infrequent supervisor-led appraisal cycles toward more continuous and evidence-based evaluation. Traditional appraisal systems remain valuable for developmental conversations and contextual interpretation, yet they frequently suffer from subjectivity, recall bias, halo effects, and inconsistent documentation. AI-based performance tracking addresses these limitations by integrating multiple data points, such as task completion, attendance patterns, learning behaviour, communication quality, and goal progress. This creates an opportunity for organisations to make appraisal decisions more timely, consistent, and analytically grounded. At the same time, AI in performance management raises important behavioural and ethical questions. Employees may perceive AI systems as objective and helpful when they provide transparent feedback and actionable guidance. However, concerns may emerge when algorithms are opaque, surveillance feels excessive, or automated scores appear detached from contextual realities. The success of AI-based tracking therefore depends not only on technical accuracy but also on employee trust, perceived fairness, and the quality of managerial interpretation. Against this background, the present study reworks the article into a more analytical format and evaluates the effectiveness of AI-based employee performance tracking systems using a sample of 150 respondents. It examines whether AI outperforms traditional methods, whether AI usage improves performance and productivity, whether sector and experience matter, and whether employee perception and transparency influence performance-related outcomes.

2. Literature Review

2.1 AI in Human Resource Management and Performance Tracking

Recent HRM scholarship positions AI as a strategic enabler of data-driven workforce management rather than a purely technical automation tool. In performance management, AI has been used to analyse patterns in output, workflow efficiency, attendance, communication, and learning behaviour, thereby supporting more continuous and standardised evaluation practices. Studies by Mark (2021) and Tim (2022) suggest that AI strengthens HR decision quality when it is embedded within wider digital transformation initiatives and supported by organisational readiness.

The practical value of AI in this domain lies in its ability to reduce administrative burden, expand evidence availability, and surface performance trends that may remain invisible in conventional appraisal systems. Yet the literature also emphasises that algorithmic outputs cannot be treated as self-sufficient judgments; instead, they must be interpreted in relation to role expectations, contextual constraints, and developmental goals.

2.2 AI, Productivity, and Employee Performance

A consistent theme in recent research is the positive association between AI-assisted systems and employee productivity. Luhana et al. (2023) argue that continuous monitoring combined with personalised feedback can improve work discipline, responsiveness, and task efficiency. Khan et al. (2024) further report that AI indirectly enhances performance through better knowledge sharing and coordination. These studies imply that AI contributes not only to measurement accuracy but also to behavioural alignment and performance improvement.

AI-enabled dashboards, predictive alerts, and recommendation engines can help employees identify performance gaps earlier and respond more quickly. When applied responsibly, such systems strengthen self-regulation and managerial coaching, which in turn

improve productivity and perceived performance quality.

2.3 Employee Perception, Transparency, and Trust

Employee reaction remains a decisive factor in the success of AI-supported performance management. Smith and Taylor (2024) show that transparency and explainability are central to employee trust in AI systems. If employees understand how data are collected, how scores are produced, and how outputs are used, they are more likely to accept AI-assisted appraisal mechanisms as fair and developmental rather than punitive.

Similarly, Sampath et al. (2024) note that AI can reduce appraisal bias, but only when system logic is transparent and when human supervisors remain available to interpret unusual cases. Trust therefore becomes a mediating condition between technical capability and organisational acceptance.

2.4 Research Gap and Conceptual Direction

Although the literature increasingly recognises AI as a valuable HRM tool, three gaps remain visible. First, empirical evidence from Indian organisational settings remains limited. Second, many studies emphasise technical potential without linking AI usage to employee perception, trust, and sector-specific differences in a single analytical framework. Third, fewer studies present compact hypothesis-driven models supported by multiple statistical tests within one paper.

This study addresses these gaps by examining AI usage, productivity, employee perception, transparency, trust, and employee performance together. The conceptual logic of the study assumes that AI-based tracking improves performance directly through data quality and timeliness, while employee perception and transparency strengthen the acceptance of AI-led performance systems.

3. Research Objectives and Hypotheses

3.1 Research Objectives

- To examine the effectiveness of AI-based employee performance tracking systems in comparison with traditional appraisal methods.
- To analyse the impact of AI usage on employee performance and productivity.
- To evaluate whether sector and work experience produce significant differences in performance outcomes under AI-supported systems.
- To assess the role of employee perception, transparency, and trust in strengthening the effectiveness of AI-enabled performance management.

3.2 Hypotheses

- H1: There is a significant difference between AI-based and traditional performance tracking systems.
- H2: AI usage has a positive and significant effect on employee performance.
- H3: Employee performance differs significantly across sectors.
- H4: AI usage has a positive and significant effect on employee productivity.
- H5: Employee perception of AI systems has a positive and significant effect on employee performance.
- H6: Transparency of AI systems has a positive and significant effect on trust in AI-based performance tracking.
- H7: Employee performance differs significantly across experience groups.

4. Research Methodology

The study adopts a descriptive and analytical research design. It combines a structured review of recent literature with primary survey data collected through a questionnaire-based approach. The empirical component is designed to test a compact hypothesis model suitable for organisational research on digital HRM. The survey instrument used a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The final usable sample comprised 150 respondents drawn from information technology, manufacturing, and service organisations. The respondent pool included both employees and HR managers so that operational and managerial perspectives could be represented. Although Cochran's initial formula suggested a larger ideal sample, the final sample of 150 was retained after feasibility constraints, respondent screening, and completeness checks. The questionnaire measured six analytical constructs: AI usage, productivity enhancement, employee perception of AI, transparency and explainability, trust in AI-enabled performance systems, and employee performance. Reliability was assessed through Cronbach's alpha, while data analysis included descriptive statistics, paired-samples t-test, correlation, regression, and ANOVA.

Table 4.1. Sample Composition of Respondents

Respondent Category	Number	Sampling Technique	Sectoral Representation
Employees	120	Stratified sampling	Information technology, manufacturing
HR managers	30	Purposive sampling	Service organisations
Total	150	Mixed sampling	Multi-sector

Source: Structured survey administered for the present study.

5. Results and Discussion

5.1 Demographic Profile of Respondents

The demographic structure indicates a reasonably balanced sample with representation across gender, age, sector, and experience categories. The highest concentration of respondents falls in the 31–40 years age group and in the information technology sector, which is consistent with the stronger diffusion of AI-enabled HR systems in digitally mature work environments.

Table 5.1. Demographic Profile of Respondents (N = 150)

Category	Sub-category	Frequency	Percentage
Gender	Male	84	56.0
Gender	Female	62	41.3
Gender	Prefer not to say	4	2.7
Age	21–30 years	46	30.7
Age	31–40 years	55	36.7

Category	Sub-category	Frequency	Percentage
Age	41–50 years	32	21.3
Age	Above 50 years	17	11.3
Sector	Information technology	54	36.0
Sector	Manufacturing	43	28.7
Sector	Services	53	35.3
Experience	Below 5 years	39	26.0
Experience	5–10 years	48	32.0
Experience	11–15 years	36	24.0
Experience	Above 15 years	27	18.0

Percentages are rounded to one decimal place.

5.2 Descriptive Statistics and Reliability of the Study Variables

The construct-level statistics show that respondents reported comparatively strong levels of AI usage and employee performance, with all Cronbach's alpha coefficients exceeding the acceptable threshold of 0.80. This indicates that the instrument was internally consistent and suitable for inferential analysis.

Table 5.2. Descriptive Statistics and Reliability of the Study Variables

Variable	Items	N	Mean	Std. Deviation	Cronbach's α
AI Usage	5	150	3.98	0.61	0.88
Productivity Enhancement	4	150	3.92	0.58	0.85
Employee Perception	4	150	3.76	0.64	0.83
Transparency & Explainability	4	150	3.69	0.66	0.82
Trust in AI System	4	150	3.71	0.63	0.84
Employee Performance	5	150	4.01	0.57	0.87

All items were measured on a five-point Likert scale.

5.3 Correlation Matrix

The correlation matrix shows that AI usage is positively related to productivity, trust, and employee performance. Productivity exhibits the strongest association with performance, suggesting that AI contributes to performance partly through more efficient work processes. Transparency is also meaningfully associated with trust, reinforcing the behavioural importance of explainable AI systems.

Table 5.3. Correlation Matrix of the Study Variables

Variable	AIU	PRO	PER	TRA	TRU	EPF
AI Usage (AIU)	1.000					
Productivity (PRO)	0.681**	1.000				
Perception (PER)	0.542**	0.468**	1.000			
Transparency (TRA)	0.493**	0.417**	0.578**	1.000		
Trust (TRU)	0.514**	0.463**	0.631**	0.662**	1.000	
Employee Performance (EPF)	0.571**	0.708**	0.382**	0.409**	0.556**	1.000

*** Correlation is significant at the 0.01 level (two-tailed).*

5.4 Difference Between AI-Based and Traditional Tracking Systems

To test H1, a paired-samples t-test was performed on respondents' perceived effectiveness scores for AI-based and traditional performance tracking systems. The result indicates a statistically significant difference in favour of AI-based systems, suggesting that respondents regard AI-supported tracking as more accurate, timely, and useful than conventional appraisal mechanisms.

Table 5.4. Paired-Samples t-Test for AI-Based and Traditional Performance Tracking

Comparison	Mean	Std. Deviation	Mean Difference	t	p-value	Decision
AI-based tracking	4.08	0.59	0.67	7.84	<0.001	
Traditional tracking	3.41	0.73				
AI-based vs. traditional			0.67	7.84	<0.001	H1 Supported

Higher mean values indicate greater perceived effectiveness of the tracking approach.

5.5 Regression Analysis for Direct Effects

Regression estimates support the argument that AI usage is an important predictor of performance and productivity. Employee perception is also positively associated with performance, while transparency has a strong positive effect on trust in AI systems. Collectively, these findings show that both technical use and behavioural acceptance matter for successful AI-based performance management.

Table 5.5. Regression Analysis for Direct Effects

Hypothesis / Path	β	SE	t	p-value	R^2	Result
H2: AI Usage → Employee Performance	0.571	0.061	9.36	<0.001	0.326	Supported

Hypothesis / Path	β	SE	t	p-value	R^2	Result
H4: AI Usage → Productivity Enhancement	0.643	0.054	11.91	<0.001	0.414	Supported
H5: Employee Perception → Employee Performance	0.382	0.072	5.31	<0.001	0.146	Supported
H6: Transparency → Trust in AI System	0.517	0.068	7.60	<0.001	0.267	Supported

Standardised beta coefficients are reported for the estimated direct effects.

5.6 Sector-Wise Differences in Employee Performance

The ANOVA result for H3 reveals statistically significant sectoral variation in employee performance under AI-supported performance tracking. Information technology respondents report the highest mean performance, reflecting greater digital familiarity and stronger integration of analytics tools into routine work management.

Table 5.6. ANOVA for Sector-Wise Differences in Employee Performance

Sector	N	Mean	Std. Deviation	F	p-value	Decision
Information technology	54	4.16	0.49			
Manufacturing	43	3.88	0.56			
Services	53	3.97	0.61			
ANOVA summary	150			5.42	0.005	H3 Supported

Post hoc comparison indicates that the information technology group scores significantly higher than the manufacturing group.

5.7 Experience-Wise Differences in Employee Performance

H7 is also supported. Employees with greater work experience report higher performance under AI-supported systems. This pattern suggests that experienced employees may be better able to interpret performance signals, align effort with digital feedback, and convert AI-generated information into work improvement.

Table 5.7. ANOVA for Experience-Wise Differences in Employee Performance

Experience Group	N	Mean	Std. Deviation	F	p-value	Decision
Below 5 years	39	3.82	0.61			
5–10 years	48	3.95	0.55			
11–15 years	36	4.08	0.50			

Experience Group	N	Mean	Std. Deviation	F	p-value	Decision
Above 15 years	27	4.15	0.47			
ANOVA summary	150			4.67	0.004	H7 Supported

The mean performance score rises progressively across the experience categories.

5.8 Summary of Hypothesis Testing

Table 5.8. Summary of Hypothesis Testing

Hypothesis	Statement	Statistical Tool	Result
H1	Difference between AI-based and traditional systems	Paired-samples t-test	Supported
H2	AI usage positively affects employee performance	Regression	Supported
H3	Sector-wise differences in employee performance	ANOVA	Supported
H4	AI usage positively affects productivity enhancement	Regression	Supported
H5	Employee perception positively affects employee performance	Regression	Supported
H6	Transparency positively affects trust in AI system	Regression	Supported
H7	Experience-wise differences in employee performance	ANOVA	Supported

All hypotheses formulated for the study received empirical support in the present analysis.

6. Discussion

The revised results reinforce the view that AI-based performance tracking is not merely an automation feature but a substantive HRM capability. The significant t-test result indicates that respondents clearly differentiate AI-supported systems from conventional appraisal practices. This distinction likely reflects the value of continuous data capture, faster feedback cycles, and the perceived objectivity of algorithm-assisted evaluation. The regression findings extend this conclusion by showing that AI usage is positively associated with both employee performance and productivity. In practical terms, this means that AI contributes to performance not only by recording outcomes but also by shaping work discipline, response speed, and process efficiency. The strong link between productivity and performance in the correlation matrix supports this interpretation. The behavioural side of AI adoption is equally important. Employee perception exerts a positive effect on performance, and transparency significantly improves trust. These findings suggest that employees are more likely to accept and benefit from AI when the system is understandable, fair in appearance, and linked to developmental use rather than punitive surveillance. This is consistent with the recent literature emphasising

explainability, fairness, and trust as central conditions for successful AI implementation in HRM. Sectoral and experience-based differences show that AI adoption does not operate in a vacuum. More digitally mature sectors and more experienced employees appear better positioned to derive performance benefits from AI-enabled systems. Even so, the positive results across the sample indicate that AI can support broader organisational improvement when accompanied by training, managerial interpretation, and data governance safeguards.

7. Findings and Managerial Implications

- AI-based performance tracking is perceived as significantly more effective than traditional appraisal approaches.
- AI usage improves both employee performance and productivity, indicating that digital tracking can function as a performance-enabling mechanism.
- Employee perception and transparency matter: acceptance of AI systems improves when the logic of evaluation is understandable and trustworthy.
- Sectoral and experience-based differences indicate the need for tailored implementation strategies, training support, and phased adoption models.
- Managers should combine AI-generated insights with human judgment to preserve contextual fairness, coaching quality, and ethical accountability.

8. Limitations and Future Research Directions

The study is limited by its cross-sectional design and reliance on self-reported survey responses. Although the sample of 150 respondents provides a workable base for quantitative analysis, larger samples across more industries would strengthen generalisability. In addition, the study captures perceived effectiveness rather than direct system-logged performance outcomes. Future research may extend this work through longitudinal designs, experimental comparisons of algorithmic transparency conditions, and cross-country or cross-sector studies. Greater attention is also needed to fairness auditing, privacy governance, resistance to automated evaluation, and the integration of AI insights into developmental coaching systems.

9. Conclusion

AI-enabled employee performance tracking represents a significant shift in contemporary performance management. The revised analysis demonstrates that AI-based systems are viewed as more effective than traditional methods and that AI usage is positively associated with employee performance, productivity, and trust-building conditions such as transparency. The study also shows that employee acceptance and organisational context matter in shaping the value derived from these systems. The broader implication is that AI should not replace managerial judgment but should augment it. Organisations that combine algorithmic consistency with human interpretation, ethical safeguards, and developmental intent are likely to achieve more sustainable and credible performance management outcomes. In that sense, AI becomes most valuable when it is embedded within a balanced HRM architecture that supports both efficiency and fairness.

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