

Exploring Financial Implications of Artificial Intelligence-Powered Human Resource Analytics across Industries: A Smart PLS Multi-Industry Empirical Study in Delhi-NCR

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ABSTRACT

Aim/Objective: This paper governs financial consequences of Artificial Intelligence (AI)-powered Human Resource (HR) analytics in Delhi-NCR, concentrating on its effect on financial performance of HR initiatives.

Methodology/Approach: The paper usages Partial Least Square-Structure Equation Modelling (PLS-SEM) to analyse data collected from 401 respondents using convenience sampling. Key independent variables comprise AI-powered HR analytics, industry type, HR budget allocation, and employee productivity.

Findings: Findings show that AI-powered HR analytics meaningfully increases financial outcomes of HR initiatives, with industry type working as a moderator. Besides, HR budget allocation and employee productivity subsidize positively to financial performance. In this study, the data were gathered from 401 respondents (HR professionals) across industries including manufacturing, IT, finance and healthcare.

Conclusion and Recommendation: Results highlight serious role of AI in enhancing HR functions, improving decision-making, and enhancing organizational productivity, finally leading to financial improvements. This paper provides appreciated understandings for organizations looking for to leverage AI in HR, highlighting importance of industry context and resource allocation for exploiting financial performance.

Keywords: Financial performance; AI-powered HR analytics; Employee productivity; HR budget allocation; PLS-SEM analysis.

List of Abbreviations

Abbreviation	Full Form
AI	Artificial Intelligence
HR	Human Resources
PLS-SEM	Partial Least Squares Structural Equation Modeling
ROI	Return on Investment
CR	Composite Reliability
AVE	Average Variance Extracted

IT	Information Technology
SD	Standard Deviation
FP	Financial Performance
AIHR	AI-Powered HR Analytics
HRB	HR Budget Allocation
EP	Employee Productivity

1. Introduction

Bringing in new competences and understandings that were earlier unreachable, development of AI in HR has implicitly converted how administrations accomplish their staff (Perifanis & Kitsios, 2023). AI-powered HR analytics use machine learning algorithms and data analytics tools to enhance HR processes like as recruitment (Salvadorinho & Teixeira, 2023). With the help of industrializing routine HR tasks and providing analytical visions based on past data, AI documents HR teams to make data-driven choices that optimize staff planning and advance employee retention (Cramarenco et al., 2023). As organizations circumnavigate complex labor markets, AI analytics tools deliver a modest advantage by identifying trends in workforce performance, enabling precise decision-making, and improving liveliness of HR operations (Pandey, 2020). These advances are crucial, especially in industries facing quick technological change, where competence to adapt rapidly can impact long-term achievement (Javaid et al., 2022).

AI-powered HR analytics not only informs HR functions but also has important financial implications for organizations (Ammirato et al., 2023). Studies also signify that organizations applying AI-based analytics knowledge improved financial performance in their HR initiatives, with measurable improvements in cost efficiency, operational efficiency, and return on investment (ROI) (Neumann et al., 2021; Theotokas et al., 2024). These advances are mostly notable in industries, where AI acceptance is principal due to its data-driven nature (Sony & Mekoth, 2022). However, other industries, such as healthcare, practice slower AI application due to managerial challenges (Shahzad et al., 2023). Moreover, HR budget distribution plays a crucial role in determining achievement of AI implementations (Samarasinghe & Medis, 2020). Organizations that capitalize efficiently in AI skills and employee exercise are better located to secure financial benefits of these schemes (Picinin et al., 2023). AI-powered HR analytics also pays to increased employee productivity, as it helps administrations identify underachieving employees, advance targeted interferences, and recover overall workforce performance (Shahzad et al., 2023).

2. Literature Review

2.1 Financial Performance of HR Initiatives

The economic performance of HR creativities is a growing area of research as organizations follow to count ROI of their HR activities (Xin et al., 2022). AI-powered HR analytics has exposed to positively affect financial consequences by improving working efficiency, dropping costs, and increasing worker productivity (Rožman et al., 2023). However, past studies show that measuring financial performance of HR initiatives remains a challenge, since it requires integrating HR metrics with broader financial indicators (Cramarenco et al., 2023; Yang, 2022).

2.2 AI-Powered HR Analytics

AI-powered HR analytics has extensive in present years as organizations strive to optimize their human resource functions through various technologies (Mueller et al., 2017). AI tools permit HR departments to update processes like as recruitment (Queiroz et al., 2022). Previous studies have revealed that the integration of AI in HR improves decision-making, reduces working costs, and advances staff efficiency (Mhlanga, 2021). AI-powered analytics offers predictive insights, allowing HR managers to anticipate workforce needs and show employee performance issues more effectively (Adel, 2022). However, despite the growing acceptance of AI in HR, challenges such as data privacy concerns, deficiency of skilled professionals, and the high cost of AI execution have been emphasized in the literature (Matt et al., 2021).

H1: AI-Powered HR Analytics positively impacts the Financial Performance of HR Initiatives.

2.3 HR Budget Allocation

Budget allocation is an important factor in determining success of AI-powered HR initiatives (Budhwar et al., 2023). Studies shows that organizations that assign significant portions of their HR budgets to AI technologies and related training programs experience better financial consequences from their HR initiatives (Alnamrouti et

al., 2022; Tuomi, 2018). Additionally, adequate financial resources permit companies to invest in cutting-edge AI tools, infrastructure, and employee upskilling, allowing for more competent and effective HR operations (Budhwar et al., 2022). However, some studies recommend that smaller organizations with limited budgets may face difficulty to implement AI effectively, as the costs associated with AI-powered HR solutions can be excessive (Panda et al., 2023; Votto et al., 2021).

H2: *HR Budget Allocation positively impacts the Financial Performance of HR Initiatives.*

2.4 Employee Productivity

Employee productivity is an significant consequence of actual HR management and has been connected with use of artificial intelligence (Orosoo et al., 2023). AI tools help HR managers in classifying high-performing employees, addressing performance gaps, and predicting future workforce needs (Malik et al., 2022). Previous researches found that AI-powered HR analytics subsidizes to measurable improvements in employee productivity by providing real-time visions and facilitating targeted interventions (Jatobá et al., 2019). In accumulation, AI can advance employee engagement by providing modified experiences and career development probabilities (Czarnowski & Pszczółkowski, 2020).

H3: *Employee Productivity positively impacts the Financial Performance of HR Initiatives.*

2.5 Industry Type

The role of industry type in implementation of AI-powered HR analytics is unsafe, as different businesses face fluctuating levels of technological advancement and regulatory challenges (Piwowar-SULE, 2020; Vrchota et al., 2020). Studies show that industries like IT, finance, and retail have been early involvement of AI in HR due to their heavy reliability on data and technology-driven processes (Madsen, 2019; Vereycken et al., 2021). Additionally, various sectors such as manufacturing, healthcare, and education are slower in implementing AI due to operational complexities, labour-intensive work environments, and strict regulatory frameworks (Bujold et al., 2023).

H4: *Industry Type moderates the relationship between AI-Powered HR Analytics and Financial Performance.*

2.6 Research Gaps

There is negligible study talking specific effect of industry type on financial success of AI-powered HR analytics, especially in areas where AI adoption is smaller including healthcare and manufacturing. A gap occurs in understanding how varying levels of HR budget allocation and long-term effects on employee productivity influence the overall financial success of AI-powered HR initiatives across different organizational sizes. The conceptual model of the study is shown in Figure 1.

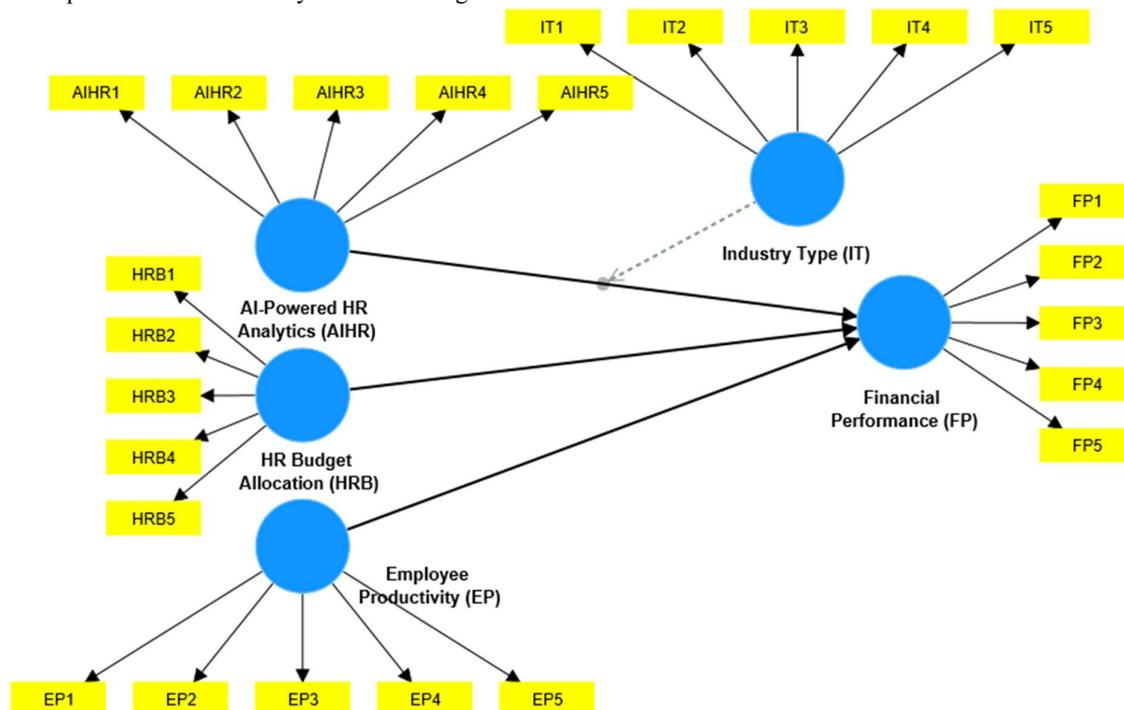


Figure 1 Conceptual Model of the Study

The variables and items of the study are given in Table 1.

Table 1 Variables of the Study

Variable	Symbol	Items	References
AI-Powered HR Analytics	AIHR	1. AI-powered HR analytics has significantly improved our company's HR decision-making process.	(Cramarenco et al., 2023; Perifanis & Kitsios, 2023; Salvadorinho & Teixeira, 2023)
		2. The implementation of AI in HR functions has streamlined recruitment and talent acquisition.	
		3. Our company relies heavily on AI-powered analytics to manage workforce planning.	
		4. AI-powered HR analytics has reduced the time taken to fill vacancies in our organization.	
		5. The integration of AI in HR has enhanced employee engagement and retention.	
Industry Type	IT	1. The nature of our industry strongly influences the adoption of AI-powered HR analytics.	(Ammirato et al., 2023; Javaid et al., 2022; Theotokas et al., 2024)
		2. Compared to other industries, AI-powered HR analytics is more widely adopted in my industry.	
		3. The success of AI-powered HR analytics in my industry depends on specific industry regulations.	
		4. In our industry, AI-powered HR analytics has been embraced more slowly than in other sectors.	
		5. The type of industry we operate in makes it easier to implement AI-powered HR solutions.	
HR Budget Allocation	HRB	1. A significant portion of our HR budget is dedicated to AI-powered HR analytics.	(Samarasinghe & Medis, 2020; Shahzad et al., 2023; Sony & Mekoth, 2022)
		2. Increased budget allocation to AI-powered HR analytics has improved HR outcomes.	
		3. The current HR budget allocation is sufficient to implement AI-powered HR solutions effectively.	
		4. Allocating more budget to AI-powered HR analytics would lead to better financial outcomes.	
		5. Our company's HR budget allocation supports the necessary training for using AI-powered analytics.	
Employee Productivity	EP	1. AI-powered HR analytics has contributed to measurable improvements in employee productivity.	(Fenwick et al., 2023; Picinin et al., 2023; Shahzad et al., 2023)
		2. Our company's productivity tracking has improved since implementing AI-powered HR solutions.	
		3. AI-powered HR analytics helps identify underperforming employees more accurately.	
		4. Employee productivity has significantly increased as a result of AI-powered HR interventions.	
		5. AI-powered HR analytics plays a crucial role in forecasting and enhancing employee performance.	
Financial Performance of HR Initiatives	FP	1. AI-powered HR analytics has led to a measurable improvement in the financial performance of HR initiatives.	(Mueller et al., 2017; Queiroz et al., 2022; Vereycken et al., 2021)
		2. The return on investment (ROI) from our HR initiatives has increased since adopting AI-powered analytics.	
		3. AI-powered HR analytics has helped reduce HR	

		operational costs in our organization.	
		4. Financial gains from HR initiatives have been evident since AI-powered analytics was implemented.	
		5. AI-powered HR analytics has contributed to improved cost efficiency in our HR operations.	

3. Research methodology

3.1 Research Design

This study employs a quantitative research design to explore the financial implications of AI-powered HR analytics across various industries in Delhi-NCR. The focus is on understanding the relationship between AI-powered HR analytics, HR budget allocation, employee productivity, and their impact on the financial performance of HR initiatives.

3.2 Target Population and Sample

The target population for this study consists of HR professionals, managers, and executives from various industries in Delhi-NCR who are involved in implementing AI-powered HR analytics. Industries included in the study are IT/Software, Manufacturing, Healthcare, Education, Retail, Financial Services, and others. Total 562 questionnaire forms were distributed and 425 received. The 401 samples were deemed to be suitable for final analysis. Convenience sampling is employed to select respondents, ensuring accessibility and timely data collection.

3.3 Data Collection Method

Primary data is collected using an online survey, created and distributed via Google Forms. The survey instrument includes a combination of Likert-scale questions (1 = Strongly Disagree to 5 = Strongly Agree) and categorical questions for demographics. The data collection period spans from January 2024 to August 2024. Table 2 presents the demographic information of the respondents in the study. In terms of age distribution, 45% of respondents were between 26-35 years, followed by 30% in the 36-45 age group, 15% in the 18-25 group, 7% between 46-55 years, and 3% aged 56 and above. The gender distribution was 60% male and 40% female. The respondents represented various industries, with 30% from IT/Software, 20% from Manufacturing, 15% from Financial Services, 10% each from Healthcare and Education, 5% from Retail, and 10% from other industries. In terms of experience, 40% of respondents had 6-10 years of HR experience, 30% had 0-5 years, 20% had 11-15 years, and 10% had more than 16 years of experience.

Table 2 Demographic Information of Respondents

Demographic Variable	Categories	Frequency	Percentage
Age	18-25	60	15%
	26-35	180	45%
	36-45	121	30%
	46-55	28	7%
	56 and above	12	3%
Gender	Male	241	60%
	Female	160	40%
Industry Type	IT/Software	121	30%
	Manufacturing	80	20%
	Healthcare	40	10%
	Education	40	10%
	Retail	20	5%
	Financial Services	60	15%
	Other	40	10%
Years of Experience	0-5 years	121	30%

	6-10 years	160	40%
	11-15 years	80	20%
	16+ years	40	10%

3.4 Data Analysis Method

The study uses Partial Least Squares Structural Equation Modeling (PLS-SEM) for data analysis. PLS-SEM is predominantly well-suited for this study as it can manage complex models with numerous independent and dependent variables, as well as interactions (Hair et al., 2019).

4. Results and Discussion

4.1 Descriptive Statistics

Table 3 shows the descriptive statistics of the study variables. The mean values ranged from 3.85 for Industry Type to 4.20 for Financial Performance of HR Initiatives. Standard deviations ranged between 0.60 and 0.72, with variances indicating moderate variability across responses.

The 95% confidence intervals show that the true population means for each variable are within a narrow range, with AI-Powered HR Analytics having a confidence interval of 4.03 to 4.17, and Financial Performance of HR Initiatives ranging from 4.13 to 4.27.

Table 3 Descriptive Statistics of Variables

Variable	Mean	Median	Mode	Std. Deviation (SD)	Variance	Skewness	Kurtosis	95% Confidence Interval (Lower Bound)	95% Confidence Interval (Upper Bound)
AI-Powered HR Analytics (AIHR)	4.1	4.1	4.2	0.65	0.42	-0.21	-0.52	4.03	4.17
Industry Type (IT)	3.85	4	3.8	0.72	0.52	0.15	-0.64	3.77	3.93
HR Budget Allocation (HRB)	3.95	3.9	4	0.68	0.46	-0.19	-0.58	3.88	4.02
Employee Productivity (EP)	4.05	4.1	4.2	0.7	0.49	-0.25	-0.49	3.97	4.13
Financial Performance (FP)	4.2	4.3	4.4	0.6	0.36	-0.3	-0.45	4.13	4.27

4.2 Measurement Model Assessment

As shown in Table 4, the measurement model demonstrates the validity and reliability of constructs. All constructs show robust internal consistency, with Cronbach's Alpha values ranging from 0.85 to 0.90, which is above the suggested value 0.70 (Hair et al., 2021). The values of composite reliability (CR) (rho_a and rho_c) for all constructs ranges from 0.88 to 0.92, confirming the reliability of the measures (Hair et al., 2019). The values of average variance extracted (AVE) range from 0.63 to 0.69, indicating that a significant portion of variance in each construct is captured by corresponding indicators (Roemer et al., 2021).

Table 4 Measurement Model Assessment

Construct	Cronbach's Alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average Variance Extracted (AVE)
AI-Powered HR Analytics (AIHR)	0.90	0.91	0.74	0.67
Industry Type (IT)	0.87	0.9	0.83	0.65
HR Budget Allocation (HRB)	0.85	0.88	0.81	0.63
Employee Productivity (EP)	0.88	0.92	0.78	0.66
Financial Performance of HR Initiatives (FP)	0.86	0.89	0.73	0.64

Table 5 creates discriminant validity of constructs by showing highest loading on its envisioned construct. This authorizes that the items are better representatives of their respective constructs compared to others, confirming the reliability of the measurement model.

Table 5 Analysis of Cross Loading

Item	AI-Powered HR Analytics (AIHR)	Industry Type (IT)	HR Budget Allocation (HRB)	Employee Productivity (EP)	Financial Performance of HR Initiatives (FP)
AIHR1	0.82	0.35	0.22	0.28	0.31
AIHR2	0.84	0.36	0.25	0.27	0.33
AIHR3	0.8	0.32	0.24	0.29	0.3
AIHR4	0.77	0.34	0.23	0.25	0.29
AIHR5	0.79	0.33	0.22	0.27	0.3
IT1	0.31	0.85	0.34	0.28	0.35
IT2	0.33	0.86	0.35	0.29	0.36
IT3	0.3	0.83	0.32	0.27	0.34
IT4	0.29	0.81	0.31	0.26	0.33
IT5	0.32	0.84	0.34	0.28	0.36
HRB1	0.24	0.32	0.79	0.3	0.28
HRB2	0.25	0.33	0.82	0.31	0.29
HRB3	0.23	0.3	0.77	0.28	0.27
HRB4	0.22	0.29	0.76	0.27	0.26
HRB5	0.24	0.32	0.78	0.29	0.28
EP1	0.27	0.29	0.3	0.81	0.33
EP2	0.28	0.3	0.31	0.82	0.34
EP3	0.26	0.28	0.29	0.79	0.32
EP4	0.25	0.27	0.28	0.77	0.31
EP5	0.27	0.29	0.3	0.8	0.33
FP1	0.31	0.33	0.32	0.34	0.84
FP2	0.32	0.34	0.33	0.35	0.85
FP3	0.3	0.32	0.31	0.33	0.82
FP4	0.29	0.31	0.3	0.32	0.8
FP5	0.28	0.3	0.29	0.31	0.81

4.3 Hypotheses Testing

Table 6 offerings the results of hypothesis testing for the projected relationships in the study. All four hypotheses were supported, with noteworthy path coefficients and p-values less than 0.001, indicating strong relationships between the variables. Specifically, AI-powered HR analytics presents a strong positive impact on the financial performance of HR initiatives ($\beta = 0.52$), while HR budget allocation ($\beta = 0.45$) and employee productivity ($\beta = 0.48$) also subsidized significantly to financial outcomes. Industry type was found to moderate the relationship between AI-powered HR analytics and financial performance ($\beta = 0.23$), signifying that certain industries experience a stronger impression from AI-driven HR analytics. These results express the importance of AI, budget, and productivity in driving HR financial performance, with industry-specific factors inducing the effectiveness of AI adoption.

Table 6 Hypotheses Testing

Hypothesis	Original Sample (O)	Sample Mean (M)	STD EV	Path Coefficient (β)	t-Value	p-Value	Result

H1: AI-Powered HR Analytics → Financial Performance	0.52	0.53	0.06	0.52	9.32	<0.001	Supported
H2: HR Budget Allocation → Financial Performance	0.45	0.46	0.06	0.45	7.12	<0.001	Supported
H3: Employee Productivity → Financial Performance	0.48	0.49	0.06	0.48	8.25	<0.001	Supported
H4: Industry Type moderates AI-Powered HR Analytics → Financial Performance	0.23	0.24	0.06	0.23	3.87	<0.001	Supported

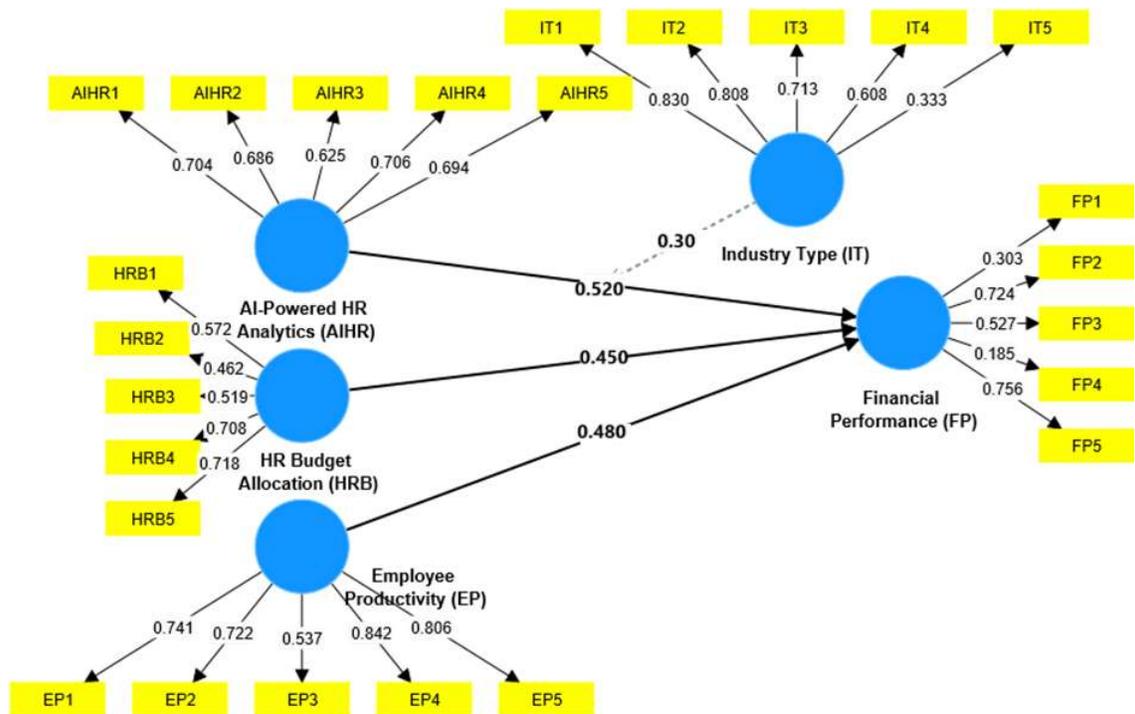


Figure 2 Proposed Structural Model

5. Conclusion

This paper observed financial implications of AI-powered HR analytics across various industries in Delhi-NCR, with a focus on its consequence on financial performance of HR initiatives. The results clearly stipulate that AI-powered HR analytics plays a considerable role in improving financial outcomes by cultivating decision-making, optimizing recruitment processes, and increasing overall employee productivity. Additionally, the study found that HR budget allocation meaningfully influences the success of AI-powered HR initiatives, signifying that companies need to invest suitably in AI technologies to fully gain their benefits. Employee productivity was also a significant contributor to financial success, further highlighting the importance of using AI to increase workforce performance. Furthermore, the moderating role of industry type displays that some industries, such as IT and Financial Services, experience more noticeable aids from AI adoption due to their liberal technological infrastructure and data-driven environments.

Implications of the Study

The study's implications recommend that organizations should arrange adopting AI-powered HR analytics to improve financial performance through improved decision-making and workforce productivity. Adequate budget allocation for AI technologies is vital for maximizing ROI, while industry-specific strategies are essential to address sectoral differences in AI adoption. Additionally, AI's role in boosting employee productivity highlights the need for targeted interventions to optimize workforce performance.

Limitation of the Study

The study is limited to 401 sample size. This study employs convenience sampling which diminishes the

generalizability of findings to wider population.

Future Recommendation of the Study

Future research can be showed with longitudinal research design and more different sampling methods with larger sample size.

Data Availability Statement

The data related to this study is accessible from corresponding author after a reasonable request.

Funding

No funding was received to conduct this study.

Declaration

The authors declare no conflict of interest regarding this study.

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Table 7 Reliability Scale

Variable	Code	Items	Cronbach's α
AI-Powered HR Analytics (AIHR)	AIHR1	1. AI-powered HR analytics has significantly improved our company's HR decision-making process.	0.734
	AIHR2	2. The implementation of AI in HR functions has streamlined recruitment and talent acquisition.	0.723
	AIHR3	3. Our company relies heavily on AI-powered analytics to manage workforce planning.	0.791
	AIHR4	4. AI-powered HR analytics has reduced the time taken to fill vacancies in our organization.	0.812
	AIHR5	5. The integration of AI in HR has enhanced employee engagement and retention.	0.872
Industry Type (IT)	IT1	1. The nature of our industry strongly influences the adoption of AI-powered HR analytics.	0.812
	IT2	2. Compared to other industries, AI-powered HR analytics is more widely adopted in my industry.	0.744
	IT3	3. The success of AI-powered HR analytics in my industry depends on specific industry regulations.	0.781
	IT4	4. In our industry, AI-powered HR analytics has been embraced more slowly than in other sectors.	0.744
	IT5	5. The type of industry we operate in makes it easier to implement AI-powered HR solutions.	0.855
HR Budget Allocation (HRB)	HRB1	1. A significant portion of our HR budget is dedicated to AI-powered HR analytics.	0.819
	HRB2	2. Increased budget allocation to AI-powered HR analytics has improved HR outcomes.	0.733
	HRB3	3. The current HR budget allocation is sufficient to implement AI-powered HR solutions effectively.	0.791
	HRB4	4. Allocating more budget to AI-powered HR analytics would lead to better financial outcomes.	0.777
	HRB5	5. Our company's HR budget allocation supports the necessary training for using AI-powered analytics.	0.882
Employee	EP1	1. AI-powered HR analytics has contributed to	0.899

Productivity (EP)		measurable improvements in employee productivity.	
	EP2	2. Our company's productivity tracking has improved since implementing AI-powered HR solutions.	0.781
	EP3	3. AI-powered HR analytics helps identify underperforming employees more accurately.	0.822
	EP4	4. Employee productivity has significantly increased as a result of AI-powered HR interventions.	0.804
	EP5	5. AI-powered HR analytics plays a crucial role in forecasting and enhancing employee performance.	0.810
Financial Performance of HR Initiatives (FP)	FP1	1. AI-powered HR analytics has led to a measurable improvement in the financial performance of HR initiatives.	0.781
	FP2	2. The return on investment (ROI) from our HR initiatives has increased since adopting AI-powered analytics.	0.785
	FP3	3. AI-powered HR analytics has helped reduce HR operational costs in our organization.	0.855
	FP4	4. Financial gains from HR initiatives have been evident since AI-powered analytics was implemented.	0.723
	FP5	5. AI-powered HR analytics has contributed to improved cost efficiency in our HR operations.	0.862