HR Analytics with Artificial Intelligence: Transforming the Workforce

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Abstract: *Research paper investigates the impact of this convergence on the workforce, exploring its potential to improve talent acquisition, retention, engagement, and overall decision-making. The world of work is undergoing a radical shift, and Human Resources (HR) is at the forefront of this change. Traditional methods of managing people are no longer sufficient in today's data-driven landscape. This is where HR Analytics with Artificial Intelligence (AI) comes in, offering a powerful combination to revolutionize workforce management. HR Analytics involves collecting, analyzing, and interpreting data related to your employees to gain insights that drive strategic HR decisions. AI enhances this process by automating tasks, identifying hidden patterns, and making predictions based on complex data sets. This allows HR professionals to move beyond intuition and gut feeling, making data-driven decisions that benefit both the organization and its employees. This research paper investigates the impact of this convergence on the workforce, exploring its potential to improve talent acquisition, retention, engagement, and overall decision-making.*

Keywords: *HR Analytics, Artificial Intelligence, Workforce Analytics.*

Introduction

HR analytics is the application of statistics, modelling, and analysis of employee-related factors to improve business outcomes.

Analytics:

- Analysing anything , it may be a situation in a very effective manner.
- It refers to what has happened in the past
- The main reason for analysing the data is to design the future

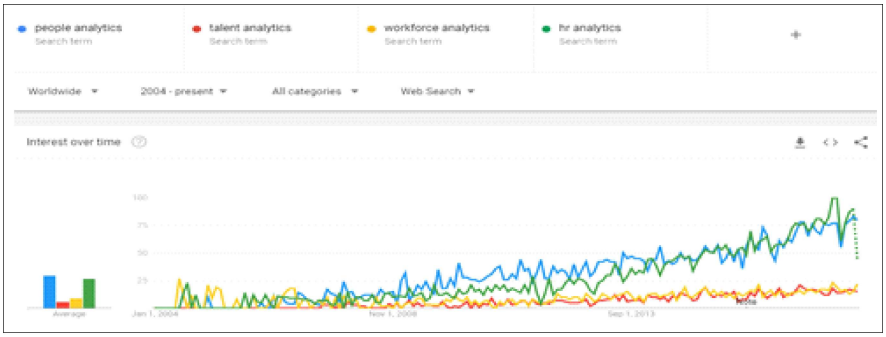

Figure 1 : Google Trends Survey 2004

Source: Internet

What is HR Analytics with AI?

The data is not just informing HR decisions, but driving them. That's the essence of HR Analytics. It involves collecting, analyzing, and interpreting employee data (performance, engagement, demographics, etc.) to gain valuable insights. When we add AI to the mix, things get even more exciting. AI acts as a supercharged analyst, automating tasks, analyzing vast amounts of data, and unlocking hidden patterns that humans might miss.

Why is it important?

Data-driven decisions: Replace gut feeling with concrete evidence, leading to more informed and effective HR strategies.

Improved talent management: Identify high-potential employees, predict flight risk, and personalize learning & development initiatives.

Enhanced engagement: Understand employee needs and satisfaction, leading to improved morale and productivity.

Streamlined processes: Automate repetitive tasks like resume screening and interview scheduling, freeing HR professionals for more strategic work.

Competitive advantage: Attract and retain top talent, optimize workforce planning, and gain valuable insights for data-driven decision-making across the organization.

AI in HR isn't just about technical marvels. It's about creating a more human-centric workplace. Imagine:

Personalized career paths: AI can help employees chart their unique journeys within the organization based on skills, strengths, and aspirations.

Proactive well-being support: AI can identify signs of burnout or stress early on, allowing for timely interventions and support mechanisms.

Fair and unbiased decisions: AI algorithms can be trained to be objective, mitigating potential biases that plague traditional HR processes.

Classifying HR Data:

HR Data can be classified into 4 categories. Those four types are Descriptive, Diagnostic, Predictive and Prescriptive.

Descriptive Analytics

Descriptive Analytics describes what already has happened in the past. Identify the problems by studying the past data. In a sales department of the organization a report shows percentage of sales employees that have left the organization in past one year. It can be segregated into business unit or product line.

Diagnostic Analytics

Diagnostic Analytics represents the causes/ reasons revealed by the happening revealed by descriptive analytics. We can rank the reasons as to why Sales department employees departed? It may be due to higher base salary offered by competitors.

Predictive Analytics

Predictive Analytics tell us what will happen in the future. It predicts the future event based on the past event. If the forecast is sales employees are going to resign in next 90 days, then we can advise the managers to approach and talk to them before it's too late.

Prescriptive Analytics

Prescriptive Analytics suggest what we should do next. Here decisions are taken based on the predictions. There is formulation of new strategies to streamline the system or the business processes. The decision that is taken is completely based on data and is more reliable. If we have sales representatives resigning then prescriptive analytics may suggest a training program to be administered to them before their productivity is likely to decline. HRM will have to migrate from fundamentals of people science (resources) to Strategic HR (Decision taken based on data/ information)

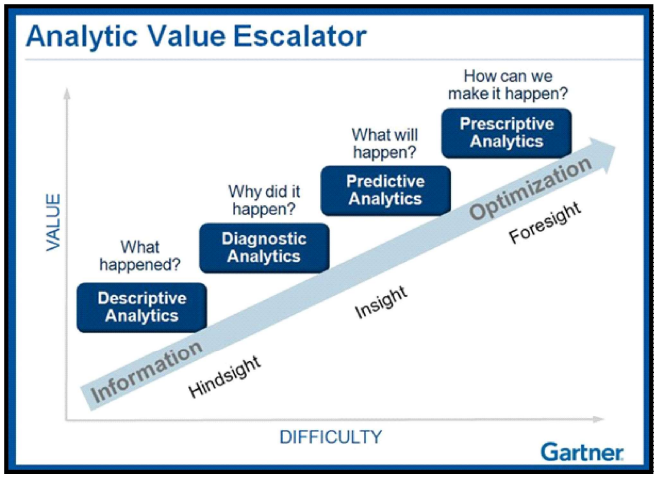

Figure 2 : Analytic Value Escalator

Source: Secondary

Recruitment Metrics

What Is Recruitment Analytics?

Recruitment analytics is a process of using data-driven metrics and insights to improve the sourcing of the best candidates for different roles within the organization that will help cut costs and better understand factors that are influencing the hiring process.

Recruiting metrics are measurements used to track hiring success and optimize the process of hiring candidates for an organization. When used correctly, these metrics help to evaluate the recruiting process and whether the company is hiring the right people.

The recruitment process is undergoing a dramatic transformation thanks to HR Analytics and AI. By leveraging data and intelligent tools, organizations can make informed decisions, optimize their pipelines, and ultimately hire the best candidates. But how do you measure the success of this data-driven approach? It all comes down to recruitment metrics.

Figure 3 : AI in Talent Acquisition

Source: Secondary

Major recruitment metrics: (Identify the health of the recruitment system)

Recruitment tracker, Matrices Analysis

1. Time to fill:

This refers to the time it takes to find and hire a new candidate, often measured by the number of days between publishing a job opening and hiring the candidate. The process begins with a requisition being approved by a company and extends to the point when the candidate has completed the necessary background checks and the candidate is hired.

- *Start Date – Date of Interview*
- *Start Date – Date of Joining*
- *1st interview - Date of Joining*

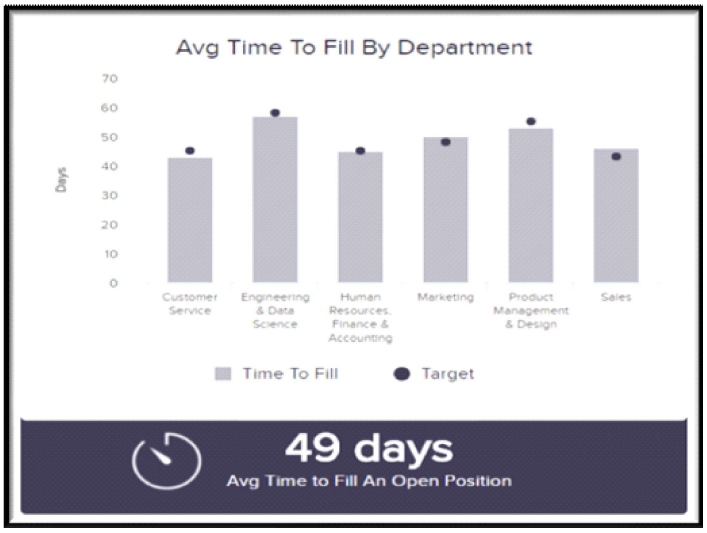

Figure 4: Avg Time to fill by department

Source: Author

2. Quality of hire:

This recruiting metric basically indicates whether the person who is appointed / hired in the position is good or bad for the organization. It is generally used to measure the performance of a hire during a 6 moths / 1-year time period. Low ratings can indicate bad hires, and this can cost companies a substantial amount of money.

*Quality of Hire = (Number of hired candidates considered satisfactory / Total Number of candidates hired) *100*

Factors of Evaluation:

- Number : ½ year, 1 year;
- Unit: Year/ Month
- Turn Around Time (TAT): Avg. turnaround time : 6 months / 1 year
- Relation wrt Company's profit(Y/N) : Lesser the time more the profit: Y (For Good appraisals)
- Measurable (Y/N): Y

Case:

Total hired last financial year: 350

Good Performers: 120: Quality of hire: (120/ 350)*100 = 34%

Average Performers: 80 : Quality of hire: (80/350)*100 = 23%

Poor Performers : 150: Quality of hire: (150/350)*100 = 43%

It is observed that 43 % are poor performers.

Prescriptive Analytics :

- We need to revamp the recruitment process and see from which source of recruitment we get quality hires.

3. Cost per hire: Sourcing Channel Cost:

The money spent during the recruitment process can be a very efficient way to allocate spending. It's important to look at all of your costs when hiring an employee so that you can learn where you can cut costs during the hiring process without affecting the candidate's quality or experience level.

$$Cost\ per\ hire = \frac{Total\ recruitment\ cost}{Total\ number\ of\ hires} = \frac{Total\ internal\ cost + Total\ external\ cost}{Total\ number\ of\ hires}$$

Case:

Table 1

Sources	Expenses (Rs)	Per source expense	Expense Rate (%)	Number of hires	Per Hire Cost/ Source (Rs)	Cost (Rs)
Job Portal	200000	200000/ 600000	33	30	200000/30	6667
Consultancy	250000	250000/ 600000	42	20	250000/20	12500
Employee Referral	50000	50000/ 600000	8	10	50000/10	5000
Campus Drive	100000	100000/ 600000	17	45	100000/45	2222
Total Expense	600000					

Source: Author

Prescriptive Analytics :

- It is observed that Consultancy gives only 20 candidates and per candidate cost is RZs 12,500/-
- Most effective source of recruitment is Campus drive where per candidate cost is Rs 2222/-

4. Recruitment funnel effectiveness: Yield Ratio

➢ Recruitment is a funnel which begins with sourcing and ends with a signed contract. By measuring the effectiveness of all the different steps in the funnel, you can specify a yield ratio per step. This makes for some excellent recruiting metrics.

$$Yield\ ratio = \frac{Number\ of\ applicants\ who\ successfully\ competed\ the\ stage}{Total\ number\ of\ applicants\ who\ entered\ this\ stage}$$

Figure 5: Yeild Ratio

Source: Author

Case: Table 2: Yield Ratio

Source	Number of Application Received	Number of hiring	Yield Ratio/ Effectiveness	Level of performance
Employee Referral	10	3	3/10*100=30%	High
Job Portals	50	25	50%	Low
Social networks	20	8	40%	Medium

Source: Author

Prescriptive Analytics:

In the job portal even though 50% is yield ratio but they are of low performers. On the other hand employee referral depicts 30% yield ratio with high performers.

3.Attrition metrics :

High employee turnover (attrition) is costly and disruptive, impacting productivity, morale, and knowledge retention. Conversely, retaining top talent fosters a stable and high-performing workforce. This is where HR Analytics and AI come in, empowering organizations to measure, understand, and predict attrition, ultimately improving retention strategies.

Gallup Survey Score / Employee Survey Score :

The Gallup Q12 score represents the average of the scores of 12 items that Gallup has consistently found to measure employee engagement as linked to business outcomes.

Measurement That Means Something:

- Employees answer 12 simple questions, available in over 30 languages including Arabic, Chinese, Spanish, French, German and more, that tie directly to performance outcomes.
- Scores are on a 1 to 5 scale, which clearly highlights strengths and opportunities.
- Scoring : 1 to 5 point scale statements; 1 : Strongly Disagree to 5 : Strongly agree. Score between 1 to 3 : Not attached to the company.

- When improvement efforts focus on the essential elements of engagement, those measured by the Q^{12} survey, team performance

Gallup Q12 Questions Case:

1. Do you know what is expected of you at work?
2. Do you have the materials and equipment to do your work right?
3. At work, do you have the opportunity to do what you do best every day?
4. In the last seven days, have you received recognition or praise for doing good work? Scale : 4 /5 = 4/5*100 = 80%
5. Does your supervisor, or someone at work, seem to care about you as a person?
6. Is there someone at work who encourages your development?
7. At work, do your opinions seem to count?
8. Does the mission/purpose of your company make you feel your job is important?
9. Are your associates (fellow employees) committed to doing quality work?
10. Do you have a best friend at work?
11. In the last six months, has someone at work talked to you about your progress?
12. In the last year, have you had opportunities to learn and grow?

NetPromoter Score: NPS:

Net Promoter Score (NPS) is a management tool that can be used to gauge the loyalty of a firm's customer relationships. It serves as an alternative to traditional customer satisfaction research and is claimed to be correlated with revenue growth. NPS has been widely adopted with more than two thirds of Fortune 1000 companies using the metrics.

The NPS is a proprietary instrument developed by Fred Reichheld, who owns the registered NPS trademark in conjunction with Bain & Company and Satmetrix. Its popularity and broad use have been attributed to its simplicity and transparent methodology of use.

Figure 6 : Net Promotor Score

Source: Author

Respondents are grouped as follows:

- Promoters (score 9-10) are loyal enthusiasts who will keep buying and refer others, fuelling growth.
- Passives (score 7-8) are satisfied but unenthusiastic customers who are vulnerable to competitive offerings. (Neither support nor against)
- Detractors (score 0-6) are unhappy customers who can damage your brand and impede growth through negative word-of-mouth.

Absenteeism Rate:

Highly motivated and engaged employees take in general fewer sick days (up to 37% less, according to Gallup). Additionally, absent employees are less productive and high absence rates throughout an organization is a key indicator of lower organizational performance. Absenteeism: [(Avg no. of employees * Missed working days) / Avg. No. of Emp* Total working days]*100

4. Learning&development metrics :

Learning and development (L&D) plays a crucial role in equipping employees with the skills and knowledge they need to excel. But how can we know if your training programs are effectively driving performance and ROI? This is where HR Analytics and AI come in, providing powerful tools to measure the impact of L&D initiatives and optimize their effectiveness.

Training expenses per employee/ Training Cost per Employee:

This metric determines the cost of employee training including the travel costs, course fees, time spent etc.

Case:

Table: 3 Training expense: Total training expense / Total no. of employees who received training

S. No.	Purpose	Cost (Rs)
1	Training fees	15000/-
2	Venue Cost	5000/-
3	Travel cost	5000/-
4	Food cost	4000/-
	Total Cost	29000/-

Source: Author

Total training cost : Rs 29,000/-

Total no. Of employees : 20 (avg. employee strength for that period

So, Training cost / employee : 29,000 / 20 Rs 1450/ - per employee.

1. Training efficiency: Training Return On Investment (ROI):

Training effectiveness is important. However, measuring the efficiency of training will help you make the most of your money.

$$Training\ efficiency = \frac{Training\ expenses\ per\ employee}{Training\ effectiveness}$$

Another metric to keep track off is how satisfied employees are with development opportunity. A lack of development opportunities is a *key predictor of employee turnover*. Training is often used to reward employees and create commitment to the organization,

*Training ROI = (Cost of employee Training / Value of increased performance) *100*

*Training ROI = (Cost of employee Training / (Performance before Training – Performance after training)*100*

We refer it as KPI

Case:

Table 5: Training return on investment

	Avg. No. of Employees	Avg. Performance Turnover(Rs)	Avg. Training Cost (Rs)	Avg. per head Performance turnover(Rs)	Avg. per head Training cost
Past	25	10,00,000	35,000	*40000*	*1400*
Current	25	11,00,000	45,000	*44000*	*1800*
Past Vs Current		100,000 increased	10,000 increased	4000 increased	400 inc

Source: Author

Note:

- Avg. per head performance turnover = 10,00,000/25 = Rs 40,000; 11,00,000/25=Rs 44000/-
- Avg, per head training cost: 35,000/25 = Rs 1400; 44000/25 : Rs 1800/-

Observation:

Spending 400 extra on training cost company gets Rs 4000/- performance turn over

Training Participation Rate:

It helps to determine if "right" type of training is getting offered, the best delivery medium is being used or opportunity has been effectively communicated or not.

*Training Participation Rate = (No. of employees participated / No. of employees nominated)*100*

Case:

Table 6: Total no. of employees: 500

S.No.	Training	Nominated	Participated
1	Excel	100	80
2	Communication	100	100
3	Email ettiquate	150	100
	Total	350	280

Source: Author

Nomination :

(280 / 350)*100 = 80%

Voluntary participation: Open Training:

(280/500)*100 = 56%

Note: The internal trainer if liked then the participation increases. Gives idea about feedback of trainer.

5. Learning & development metrics

Maintaining a healthy, high-performing workforce is crucial for organizational success. However, traditional HR audits, often manual and time-consuming, may not provide the depth of insights needed to identify areas for improvement and stay ahead of the curve. Here's where HR Analytics and AI come in, revolutionizing HR audits and benchmarking to pave the way for a thriving workforce.

HR Audit with HR Analytics and AI:

Traditional HR audits:

Involve manual data collection and analysis, leading to potential inaccuracies and biases.

Focus on compliance and adherence to policies, often neglecting broader workforce trends.

Can be time-consuming and resource-intensive, limiting their frequency and impact.

HR Analytics and AI can transform this by:

Automating data collection and analysis: AI tools can process vast amounts of HR data (e.g., employee engagement surveys, performance reviews) efficiently and accurately.

Identifying hidden patterns and trends: AI can uncover deeper insights beyond basic compliance checks, revealing areas for improvement in areas like talent acquisition, retention, and development.

Predictive analytics: AI models can predict potential risks like high turnover or skill gaps, enabling proactive interventions.

Real-time insights: Continuous data analysis with AI provides up-to-date information for data-driven decision-making.

HR Audit Process:

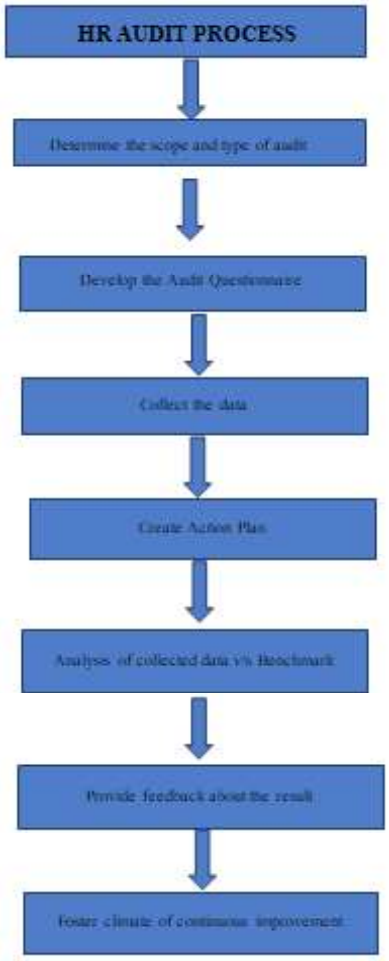

Figure 7: HR Audit Process

Source: Author

- Determine Scope: Benchmark/ Guidelines
- Audit Questionnaire : Lot Audit
- Collect data : What employees are doing : Process / System)
- Create Action Plan : Is there any gap, if yes then how to rectify

Lot Audit:

Ex.:

- Manufacturer manufactures 500000 mobile and exports
- Audit cannot test all 500000 phones
- So auditors will test from each lot
  - 1st lot of mobile : 5000 nos. : Auditor will check 5
  - 2nd lot : check : 5 and so on
- Auditors will check certain number of mobiles from each lot and not everything

Recruitment and Selection Process Audit:

Guideline:

- During Joining process candidate are asked to submit documents
- Say candidates are asked to submit documents within 7 days of joining

Table 7: Process Efficiencey

Role	Joining (Nos.)	Audit (3% of Joining)	Benchmark	Available Documents Collected
Sales Executive	240	7(resumes)	7 candidates * 7 documents = 49	40
Accounts Executive	75	2	2*7=14	14
Relationship Manager	110	3	3*7=21	15
Total			84 Docs required	69 docs. Collected.

Source: Author

Process Efficiency:

$$\text{Process Efficiency} = \frac{\text{Error found in audit}}{\text{Total no. of task given}} * 100$$

Case 1 : (69/ 84) *100 = 82%

Case 2: Gap = 84-69 = 15 (negative gap) = (15/ 84)*100 = 18%

Discuss reasons for 18% deficit and submit the report.

HR Recruitment Audit

- Benchmark can be decided by going through the company past data and other companies in same industry.
- Analyse the past data and know the standard in the past (benchmark) and then decide standard for future (audit benchmark)
- All the metrics can be audited when quantifiable.

Key Questionnaires on recruitment parameters:

- No. of openings in last 3 months
- No. of position got closed vs yet to be closed
- No. of cold calling done per opening
- No. of candidates applied per opening
- No. of candidates called for interview for per opening
- No. of candidates turned out vs dropped out
- No. of candidates got selected vs rejected
- No. of reference checks done vs to be done.

HR Operation Audit/ Admin Process Audit:

- Audit for HR Exit Process
  - Notice period
  - Notice period buy out
  - Exit interviews
  - Full and Final settlement

Case1 :notice period:

Suppose as per company policy let the notice period be 30 days.

Table 8: Notice Period

Categories	Left	Full notice	Metric (%of Notice period)	Audit (Error/ Gap%)	
Policy: 30 days(Band A,B) Employees	70	50	71	29	WHY?
Policy: 45 days(Band C,D) Employees	30	30	100	0	

Source: Author

- How many did not served the notice period and why?
- Out of 20 employees how many of them compensated (gave the notice period salary) and how many did not (Process Efficiency)

Suppose in a company 300 salesforce resigned

Sales : 300 employees left : 1st lot : 30 sample size……..10th lot : 30 sample size

So each lot having 10 samples of total 30 lots and audit will check 10 sample

Case 2: full & final settlement:

Table 9: Full and Final Statement

LOT	Exit Date	TAT 45 days (Benchmark)	Actual F&F	Delay/ Error
Sales 1	02-02-2019	19-03-2019	15-03-2019	-4
Sales 2	21-02-2019	07-04-2019	17-04-2019	10
Sales 3	04-03-2019	18-04-2019	28-05-2019	40
Sales 4	05-05-2019	19-06-2019	19-06-2019	0
Sales 5	05-08-2019	19-09-2019	19-09-2019	0
Sales 6	21-09-2019	05-11-2019	15-11-2019	10
Sales 7	21-04-2019	05-06-2019	06-07-2019	31
Sales 8	03-06-2019	18-07-2019	17-07-2019	-1
Sales 9	23-07-2019	06-09-2019	05-09-2019	-1
Sales 10	22-08-2019	06-10-2019	07-10-2019	1
Total				86

Source: Author

10 Cases : 86 delays

Per case : 86/10 = 806 delays

Audit is all about calculating error or gap efficiency

Conclusion

The integration of HR Analytics with Artificial Intelligence is not just a trend; it's a fundamental shift in how we manage people. It represents a powerful toolkit for organizations to move beyond intuition and make data-driven decisions that benefit both the organization and its employees.

Key outcomes of this transformation:

Improved talent acquisition and retention: Identify high-potential candidates, predict flight risk, and personalize development opportunities.

Enhanced employee engagement and well-being: Understand employee needs and satisfaction, and proactively address potential issues.

Streamlined HR processes: Automate repetitive tasks and free HR professionals for more strategic work.

Data-driven decision-making across the organization: Leverage HR insights to inform strategic planning and resource allocation.

Competitive advantage: Attract and retain top talent, optimize workforce planning, and gain valuable insights for data-driven decisions.

However, it's crucial to approach this transformation responsibly and ethically:

Ensure transparent and ethical data collection, storage, and usage.

Mitigate bias in AI algorithms and promote fair and objective decision-making.

Prioritize human-centric AI applications that empower and support employees.

Invest in upskilling and reskilling initiatives to help employees adapt to a changing work environment.

The future of HR is data-driven and human-centric. By embracing HR Analytics with AI while addressing ethical considerations, organizations can unlock the full potential of their workforce and build a sustainable future of work.

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