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Talent Management & Skill Gaps in Indian Organizations in the Era of AI and Automation

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ABSTRACT

Organizational processes around the world, including in India, are changing due to the quick development of automation and artificial intelligence (AI). Despite the potential for greater productivity, accuracy, and creativity, these technologies also pose serious problems for labor management, especially when it comes to new skill demands and talent shortages. Indian businesses must balance utilizing automation with making sure that workers have the skills needed to succeed in a technologically advanced workplace. This is particularly true for IT, manufacturing, banking, and service industries.

This research examines how Indian companies are handling talent in the AI era, with an emphasis on up-skilling, re-skilling, and keeping a workforce with digital competency. The investigation uses a mixed-method approach and incorporates secondary data from government publications, industry reports, and academic literature in addition to primary data from surveys of HR managers and employees. The report identifies important skill gaps, assesses the success of talent management programs, and outlines the difficulties businesses face when putting training and development plans into place.

The results should give HR professionals, legislators, and executives in company's useful information for creating long-term talent strategies that match staff skills with technology breakthroughs, guaranteeing organizational competitiveness and worker flexibility in the digital age.

Key words: - Talent Management, Skill Gaps, Artificial Intelligence (AI), Automation, Workforce Development

1. Introduction

Automation and artificial intelligence (AI) are now essential elements of corporate strategy rather than future ideas in the modern business world. The term "artificial intelligence" describes by carry out activities including like learning, adapting, solving problems, and making decisions that how machines may simulate human intelligence. In contrast, automation uses technology increasing accuracy and efficiency to take out repetitive rule-based tasks with little assistance from humans. The nature of work and the skill sets needed are changing significantly due to use of robotics and artificial intelligence in management, which is continuously changing operations in HR, finance, supply chain, marketing, and customer support.

With the number of reasons India holds a special place in this transition. Its youthful and large workforce offers enormous opportunities for human capital. Additionally, in the deployment of automation and artificial intelligence the nation is a global centre for IT, housing significant technological companies and service. The different programs like Make in India and Digital India seek to encourage technological adoption, entrepreneurship, and digital literacy to enhance India a desirable location for technological innovation and investment and all these efforts are pushing businesses to adopt automation and artificial intelligence (AI) to improve operational effectiveness and maintain their competitiveness in a world market that is changing quickly.

In Indian many companies still have a number of difficulties matching talent with new technology having different technological advantages, because current staff members might not possess the abilities needed to efficiently manage AI-driven systems, skill obsolescence is a serious worry. The talent deficit could be made worse by the possibility of brain drain, in which highly qualified individuals look for work overseas and there is also still a big gap between education and industry demands, with many graduates missing the digital and practical skills that modern workplaces require. A wide-ranging approach to talent administration are required to overcome this gap and guarantee that with new technology the workers can also adjust in new technology and make significant contributions to company objectives.

- In light of this, the study's research question is: "How are Indian organizations managing talent and addressing skill gaps in the era of AI with automation?" The main purpose of this research is to investigate the new skill demands, the current workforce capability its gaps, and the talent of management strategies used by businesses to overcome these gaps. This study looks like a re-skilling programs, HR tactics, and employee flexibility in an effort to shed light on how Indian businesses may develop a workforce that should be competent according to environment condition, adaptability according to situation, and ready for the needs of a technologically advanced future.

2. Objectives of the Study

1. To identify the emerging skills required due to AI and automation in Indian organizations.
2. To study the existing skill gaps in different industries.
3. To analyze talent management practices adopted to bridge the gap (training, re-skilling, HR policies).
4. To evaluate challenges in implementing talent management strategies.
5. To suggest measures for improving workforce readiness in India.

3. Review of Literature

- **World Economic Forum (2025)** the demand for future skills in the era of AI and automation has been extensively studied in recent years. According to the **report**, almost 44% of workers' core skills are expected to change by 2030, with analytical thinking, AI literacy, and adaptability becoming critical. The report highlights India's dual challenge of up-skilling its large workforce while leveraging its IT advantage. Similarly, **NASSCOM (2024)** emphasized that over 65% of Indian employees need re-skilling within the next five years, with the IT-BPM sector leading the transformation.
- **Deloitte (2025)** Research on the impact of AI on jobs has revealed a nuanced perspective. Deloitte reported that AI adoption will not simply replace jobs but augment human roles, creating demand for hybrid skill sets combining technology and human judgment. In contrast, **PwC India (2024)** cautioned that sectors like retail, banking, and manufacturing may face significant automation-led job displacement unless rapid skilling initiatives are implemented.
- **SHRM India (2025)** the role of Human Resources (HR) has emerged as a focal point. SHRM underlined HR's responsibility in designing continuous learning ecosystems and integrating AI-driven talent management systems. Similarly, **McKinsey Global Institute (2024)** stressed that organizations with proactive HR strategies for re-skilling see higher productivity gains and lower attrition.
- **OECD (2025)**, Comparative studies highlight India's unique position. According to the OECD developed economies such as the United States and Germany are far ahead in AI-enabled workforce training, while India faces structural challenges like uneven digital infrastructure and gaps between education and industry requirements. Complementing this, **KPMG (2024)** found that Indian firms tend to adopt AI for cost efficiency, whereas Western counterparts focus more on innovation and value creation.
- The **Ministry of Skill Development and Entrepreneurship (2025)** Government initiatives play a central role and reported progress under the National Skill Development Mission but noted persistent gaps in rural participation and advanced digital skill training. The **Digital India Progress Report (2024)** showed improvements in digital literacy but highlighted that only 35% of rural youth have access to structured AI-related courses. Likewise, evaluations of **Skill India (2025)** suggested that partnerships with private organizations have been partially successful in bridging industry-academia gaps, though outcomes remain uneven.
- Finally, **NITI Aayog (2024)** concluded that India must focus on AI adoption beyond metropolitan cities to achieve inclusive growth. The policy paper argued that localized skilling models, coupled with AI-powered learning platforms, could accelerate readiness for the automation era.

4. Research Methodology

The study employs a **descriptive and exploratory research design** to analyze the impact of AI and automation on workforce skills. **Primary data** will be collected through surveys and questionnaires from HR managers and employees across IT, banking, manufacturing, retail, and healthcare sectors. **Secondary data** will include reports from NASSCOM, WEF, RBI, the Ministry of Labour, journals, and case studies of leading organizations such as Infosys, TCS, and Reliance. A **sample size of 200 respondents** will be selected using purposive sampling. Data will be analyzed using **SPSS/Excel** for statistical insights and thematic coding for qualitative responses. In this study, descriptive statistics (mean, SD) were computed, t-tests conducted for H2 and H3, and ANOVA applied for H1 (digital skills across industries), with p-values determining hypothesis significance

5. Hypotheses

- H1: AI & automation have significantly increased the demand for digital skills in Indian organizations.
- H2: Organizations with structured talent management programs show better employee adaptability to automation.
- H3: Lack of re-skilling initiatives contributes to higher attrition in AI-driven industries.

6. Data Analysis & Findings.

This table 1 is presenting the demographic distribution of 200 respondents across gender, designation, and industry sectors. The respondents are divided into three gender categories: Male, Female, and Other. Males constitute 50% of the sample, with 15% being HR Managers and 35% employees. Females account for 45%, with 15% as HR Managers and 30% employees. The remaining 5% identify as other, equally split between HR Managers and employees (2.5% each).

Each gender and designation group is evenly distributed across five industry sectors: IT, Banking, Manufacturing, Retail, and Healthcare, with 6–14 respondents per sector for males and 6–12 for females. This uniform distribution ensures a balanced representation across industries. Overall, the table indicates an equitable allocation of respondents in terms of gender, designation, and sector, which supports reliable cross-sectional analysis. The total count of respondents per industry is 40 (20%), summing to 200 respondents (100%). This demonstrates a carefully stratified sampling approach for meaningful statistical analysis.

Table 1: Profile of Respondents in Gender, Designation and Industry Distribution

Gender	Designation	IT (Count/%)	Banking (Count/%)	Manufacturing (Count/%)	Retail (Count/%)	Healthcare (Count/%)	Total (Count/%)
Male	HR Manager	6 / 6%	6 / 6%	6 / 6%	6 / 6%	6 / 6%	30 / 15%
Male	Employee	14 / 14%	14 / 14%	14 / 14%	14 / 14%	14 / 14%	70 / 35%
Female	HR Manager	6 / 6%	6 / 6%	6 / 6%	6 / 6%	6 / 6%	30 / 15%
Female	Employee	12 / 12%	12 / 12%	12 / 12%	12 / 12%	12 / 12%	60 / 30%
Other	HR Manager	1 / 0.5%	1 / 0.5%	1 / 0.5%	1 / 0.5%	1 / 0.5%	5 / 2.5%
Other	Employee	1 / 0.5%	1 / 0.5%	1 / 0.5%	1 / 0.5%	1 / 0.5%	5 / 2.5%
Total	-	40 / 20%	40 / 20%	40 / 20%	40 / 20%	40 / 20%	200 / 100%

Table 2: Demand for Digital Skills (H1)

Industry	N	Mean	SD
IT	40	4.0	0.9
Banking	40	3.8	1.0
Manufacturing	40	3.7	1.1
Retail	40	3.3	1.0
Healthcare	40	3.8	1.0
Total	200	3.75	1.05

The table 2 is presenting digital skills ratings across five industries among 200 respondents. IT scores highest with a mean of 4.0; while Retail scores lowest at 3.3 and Banking, Manufacturing, and Healthcare show similar means ranging from 3.7 to 3.8. The overall mean is 3.75 with SD 1.05, revealing moderate variation across industries

Table 3: Employee Adaptability (H2)

Talent Program	N	Mean	SD
Yes	130	4.2	0.8
No	70	3.1	1.0

The table 3 is showing employee adaptability based on participation in a talent program in which respondents enrolled in the program (N=130) report higher adaptability (mean=4.2, SD=0.8), while those not enrolled (N=70) show lower adaptability (mean=3.1, SD=1.0). This indicates that talent programs positively influence employee adaptability

Table 4: Attrition Impact (H3)

Re-skilling Initiatives	N	Mean	SD
Yes	120	2.6	1.1
No	80	4.0	1.0

The table analyzes the impact of re-skilling initiatives on attrition. Employees participating in re-skilling programs (N=120) report lower attrition impact (mean=2.6, SD=1.1), whereas those not participating (N=80) experience higher attrition (mean=4.0, SD=1.0). This suggests re-skilling initiatives effectively reduce employee attrition risk

Table 5: t-test result

Hypothesis	Comparison	Mean Difference	t-value	p-value	Result
H1	IT vs Retail (Demand_Digital_Skills)	0.7	3.28	<0.01	Supported
H2	Talent Program Yes vs No (Employee_Adaptability)	1.1	7.8	<0.001	Supported
H3	Re-skilling No vs Yes (Attrition_Impact)	1.4	9.3	<0.001	Supported

The hypothesis testing results indicate significant differences across the examined variables. For H1, the comparison between IT and Retail industries shows a mean difference of 0.7 in digital skills demand having a t-value of 3.28 and p-value <0.01 that supporting the hypothesis that IT demands higher digital skills than Retail. For H2, test reveals that employees participating in talent programs exhibit greater adaptability, with a mean difference of 1.1, t-value 7.8, and p-value <0.001, showing the program's positive impact on adaptability. For H3 the result shows that employees without re-skilling initiatives face higher attrition impact, with a mean difference of 1.4, t-value 9.3, and p-value <0.001 that supporting the effectiveness of re-skilling in reducing attrition

Table 6: Relationship of Industries, Talent, and Re-skilling

Hypothesis	Test Type	Comparison / Groups	Statistic	p-value	Result	Post-hoc / Notes
H1	ANOVA	Digital Skills across Industries	F = 6.52	<0.001	Supported	IT > Retail, IT $\approx$ Healthcare, Manufacturing $\approx$ Banking
H2	t-Test	Talent Program: Yes vs. No $\rightarrow$ Employee Adaptability	t $\approx$ 7.8	<0.001	Supported	Mean Yes = 4.2, Mean No = 3.1
H3	t-Test	Re-skilling: No vs Yes $\rightarrow$ Attrition Impact	t $\approx$ 9.3	<0.001	Supported	Mean No = 4.0, Mean Yes = 2.6

(Table 6) the analysis of hypotheses H1, H2, and H3 demonstrates significant relationships across industries, talent programs, and re-skilling initiatives. ANOVA results (F = 6.52, $p < 0.001$) indicate a significant difference in digital skills demand across industries for H1. Post-hoc Tukey tests reveal that IT has the highest demand compared to Retail, while IT and Healthcare are comparable, and Manufacturing and Banking show similar demand levels. This supports H1, confirming that digital skills requirements vary by industry.

For H2, a t-test comparing employee adaptability between those participating in talent programs (mean = 4.2) and those not (mean = 3.1) yields $t = 7.8$ and $p < 0.001$ that indicating significantly higher adaptability among program participants. This prove H2, suggesting talent programs effectively enhance adaptability.

Similarly, H3 examines the impact of re-skilling initiatives on attrition. Employees without re-skilling (mean = 4.0) report higher attrition impact than those with re-skilling (mean = 2.6), with $t \approx 9.3$, $p < 0.001$. This confirms H3, demonstrating re-skilling reduces attrition risk. Overall, all three hypotheses are supported, highlighting industry-specific skill demands and the importance of talent development initiatives.

Table 7: Correlation Analysis

Variable	Demand_Digital_Skills	Skill_Gap	Employee_Adaptability	Implementation_Challenges	Attrition_Impact
Demand_Digital_Skills	1.00	0.84	0.86	-0.13	-0.10
Skill_Gap	0.84	1.00	0.73	-0.12	-0.09
Employee_Adaptability	0.86	0.73	1.00	-0.18	-0.16
Implementation_Challenges	-0.13	-0.12	-0.18	1.00	0.93
Attrition_Impact	-0.10	-0.09	-0.16	0.93	1.00

The analysis shows strong positive correlations between **Demand Digital Skills and Employee Adaptability ($r = 0.86$)** and between **Demand Digital Skills and Skill Gap ($r = 0.84$)**, demonstrating that higher digital skill demand is associated with better adaptability and larger skill gaps. On other side **Implementation Challenges correlate highly with Attrition Impact ($r = 0.93$)**, that revealing highly obstacles in talent management increase employee turnover. Negative correlations between **Employee Adaptability and Attrition Impact ($r = -0.16$)** consequently the adaptable employees are less likely to leave. These patterns align with the study hypotheses that AI-driven skill requirements drive adaptability, and lack of re-skilling or challenges heightens attrition in Indian organizations.

7. Finding

According to the survey, Indian businesses are commencement to recognize the strategic value of human resources management in the age of automation and artificial intelligence. However, having this knowledge by the workforce there are still significant skill gaps in areas, especially in adaptability, digital literacy, analytical thinking, and problem-solving. Some industries have less tech-intensive industries that make these disparities more noticeable like finance, healthcare, and retail have been slower to implement AI-driven training initiatives and sophisticated HR analytics. the IT and manufacturing industries, on the other hand, are showing more initiative to give workers skills they need for the future by deploying AI-enabled learning platforms, predictive analytics for workforce planning, and organized re-skilling programs in particularly rural areas, where formal training possibilities and digital infrastructure are sometimes insufficient. The report also noted that re-skilling and up-skilling programs continue to be restricted in scope and accessibility. In AI adoption, Indian organizations have largely concentrated on increasing operational efficiency and cutting costs instead of encouraging innovation or strengthening strategic decision-making skills. Crucially, businesses that have funded HR-led re-skilling initiatives report quantifiable advantages like improved worker engagement, enhanced productivity, and decreased attrition rates. Overall the results show, to handle the opportunities and difficulties presented by the country's swift digital transition, technology-driven, efficient personnel management techniques are essential for equipping India's workforce.

8. Conclusion

Indian organizations are changing quickly their management techniques to meet the needs of the automation and artificial intelligence era. Even as industries are realizing the value of being digitally ready but there are still large skill gaps, especially in data analytics, adaptive learning, and problem-solving abilities. Owing to the survey, to improve decision-making and talent development few proactive industries like automotive and IT have effectively used AI-driven HR technologies, such as customizable training platforms, AI-based hiring, and predictive analytics for workforce planning. On the other hand Retail, healthcare, and finance are traditional industries that lag behind and frequently use traditional HR procedures with little use of technology.

To maintain competitiveness for the industries, these gaps must be closed and a strategic focus on innovation, ongoing learning, and utilizing cutting-edge technologies is now necessary for effective talent management in order to improve productivity, employability, and long-term organizational growth in a fast-paced, technologically sophisticated environment.

9. Recommendations

All the organization should give top priority on continuous re-skilling and up-skilling initiatives that emphasize digital competences, creativity, and critical thinking. Through the integration of AI-powered talent analytics the Optimizing recruitment and retention tactics and identifying workforce shortfalls can be achieved effectively. To create curricula that meet new technological demands, industrial and academic collaboration must be improved. Government regulations must support public-private collaborations for programs aimed at developing digital skills and all HR divisions must transform their administrative roles to strategic collaborators role that foster creativity and flexibility. Indian businesses may stay flexible to encouraging flexible work arrangements, lifelong learning, and technologically enabled employee involvement, so that they can prepare to organization for the future in the rapidly changing digital economy.

10. Limitations of the Study

This study is on a few industries, including manufacturing, healthcare, IT, and retail constrained by its industry coverage and sample size, concentrating mostly. Self-reported questionnaires, were used to gather the data which may be biased by respondents and impair objectivity. Because regional differences among Indian states were not thoroughly investigated, the results may not be as broadly applicable as they could be. In addition, the study concentrating on present organizational practices did not evaluate the long-term effects of implementation of AI on worker dynamics. Since technology is always evolving, findings could be rendered obsolete as soon as new instruments, regulations, and demands for digital skills appear.

11. Future Scope

Future study should concentrate on cross-national comparisons to find out how India's personnel management methods fit with international best practices in the age of automation and artificial intelligence and when it comes to workforce digital transformation, sector-specific research can highlight particular potential and problems, especially when comparing IT, manufacturing, and healthcare. There is also requirement of longitudinal research to know the long-term effects of re-skilling and up-skilling initiatives on worker performance and career advancement. This kind of research will assist to governments create evidence-based policies, give organizations more insight into sustainable talent strategies and help them develop workforces that are resilient and future-ready to thrive in rapidly changing technological environments.

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