

The Recent Transformation in Technology: Upskilling and Reskilling as a Strategic HR Imperative

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Abstract- The world of work is undergoing a radical transformation of workforce, competency consistently provides competitive advantages for businesses, making human resource more effective, competency-based hiring, development and performance evaluation have gained prominence due to the rapid adoption of generative AI, shifting employee expectation, skill shortages and global economics volatility and evolving workforce dynamics. Reskilling and upskilling are no longer optional—they are necessities. According to the world economic forum (WEF), estimated that, by 2025, 50% of all employees will need reskilling due to adopting new technology. Emerging competencies will reshape the workforce, required both employee and organisation to rethink how they prepare for the future.

Industries must cultivate a proactive approach; organisations should actively equip employees with new skills to adapt emerging technologies and market demand. Reskilling not only enhances employee's capacities but also fosters a culture of continuous learning and adaptability. This study to analyses a systematic change to close skill gaps and encourage industry-led collaboration in skills mapping and talent development. The finding aims to provide a framework for human resource leaders to design and implement effective talent management strategies that resonate in an era of change, thereby securing a sustainable competitive edge.

This study explores the strategic HR imperative of upskilling and reskilling in traditional sector as compared to IT sectors with in the broder context of talent management amidst constant change of lifelong learning opportunities must be accessible, available, and affordable to the workforce.

Key Words: - Transformation, Competency, Strategies, Upskilling, Reskilling, Talent.

I. INTRODUCTION

In today's fast-paced, digitally driven global economy, the nature of work is undergoing rapid transformation. Technological advancements such as AI, automation, and cloud computing are reshaping roles and rendering traditional skill sets obsolete. This dynamic environment has made

upskilling and reskilling not only necessary but a strategic imperative for HR departments worldwide. Organizations that embrace talent development proactively are better positioned to remain competitive, foster innovation, and retain top talent.

The workforce intelligence refers to the ability to collect, connect and analyse data about people, skill and work itself across both internal systems and external market environment. it helps organisations to understand not just who is in their workforce, but why they're capable of today's working environment, how work is evolving and where future gaps will emerge. HR and Business leaders can build more adaptable talent strategies that are aligned to business goals.

Reskilling refers to acquiring new skills to perform different tasks or transition into new roles, it is a crucial component of continuous learning and is vital for career advancement in the digital age. While the idea of reskilling employees applies to organisations across various sectors, it is particularly crucial for the information technology (IT) industry. The field is highly dynamic and constantly being disrupted by the emergence of new technologies. IT professionals become essential to ensure they can meet the organization's changing demands and remain relevant in this rapidly transforming landscape. while upskilling involves enhances existing skills to meet changing job requirements. HR leaders understand that reskilling and upskilling employees are critical to future proofing the workforce improving employee's retention and fostering innovation and adaptability within the organisation. Thus, a good understanding of reskilling and upskilling is essential for the successful implementation of digital transformation (Yukiran, 2024).

II.LITERATURE REVIEW

In many traditional sectors, reskilling and upskilling have become a top priority in human resource (HR)

development strategies. The traditional manufacturing, agriculture, and service sectors, for example, require a workforce capable of working with the latest technologies, such as production management software, automation systems, and cloud-based devices (Rahyu DK., 2024). Therefore, these companies must provide the right training to improve the digital skills of their workers. Without this skill adjustment, they risk losing their competitiveness and not being able to take advantage of the full potential of existing technology (Wahyudi et al., 2023). The role of technology-based training in the traditional sector is crucial, given that many jobs that were previously done manually can now be automated. This creates an urgent need to reskill the workforce (Wulandari & Tumanggor, 2024). Therefore, organisations that want to remain competitive in the digital era must build training programs that prioritize digital technology and skills, and ensure that the training is accessible to all levels of workers, from the lowest level to senior managers (Rachbini, 2023). However, the main challenge in the implementation of reskilling and upskilling in the traditional sector is the inability of most employees to access relevant training. Many employees in the traditional sector have educational backgrounds and skills that do not fully support the needs of new technologies (Firdaus dkk., 2021). In addition, the digital technology divide between generations is also a problem, where older employees may find it more difficult to adapt to new technologies compared to younger generations who are more accustomed to technological developments (Fadillah & Fasa, 2021). The skilled and trained human resources is becoming increasingly apparent as the demand of market, while in the traditional sector, this can include an understanding of information system and ability to adapt a wider range of digital transformation as challenge.

Digital transformation is also affecting the way organisation manage their human resources. Organisation are now starting to realize that HR development is not only about training technical skills, but also about changing culture and mindset. Therefore, building a culture of continuous learning and adaptation is indispensable to support the success of digital transformation in the long term. Reskilling and upskilling programs should be seen as strategic investments that allow companies to not only survive, but thrive in the ever-changing digital era (Maharani dkk., 2022).

The World Economic Forum forecasts that by 2025, half of the workforce will need to acquire new skills because of emerging technologies. Over the next five years, more than two thirds of the skills currently seen as essential will evolve. Furthermore, by 2025, a third of the skills identified as crucial will be technological, even though they aren't considered vital today (Li, 2022). These anticipated impacts of digital transformation and automation on the global workforce underscore the importance of strategic planning for reskilling and upskilling to support organizational growth and innovation (LinkedIn Learning Report, 2020). Businesses must ensure that their employees possess the skills required in a rapidly advancing technological landscape. Reskilling and upskilling initiatives can help achieve this goal. By investing in their workforce's skill development, companies can adapt more effectively to market shifts and capitalize on new opportunities. It's essential for businesses to recognize the need for a unified approach that combines people, processes, and technology to drive growth and performance. Training programs tailored to the demands of digitalization can help realize this comprehensive strategy. Furthermore, organizations that provide opportunities for professional development are more appealing to potential hires and are better equipped to retain their existing talent. As global economies evolve, the demand for ongoing learning and skill enhancement is increasing. This rise is driven by the need for competencies in complex problem-solving, critical information evaluation, creative thinking, effective people management, work organization, emotional intelligence, sound judgment, decision-making, negotiation skills, and mental agility to adapt to new and changing circumstances. To meet job expectations and remain relevant, employees must The World Economic Forum forecasts that by 2025, half of the workforce will need to acquire new skills because of emerging technologies. Over the next five years, more than two thirds of the skills currently seen as essential will evolve. Furthermore, by 2025, a third of the skills identified as crucial will be technological, even though they aren't considered vital today (Li, 2022). These anticipated impacts of digital transformation and automation on the global workforce underscore the importance of strategic planning for reskilling and upskilling to support organizational growth and innovation (LinkedIn Learning Report, 2020). Businesses must ensure that their employees possess the skills required in a rapidly advancing technological landscape.

Reskilling and upskilling initiatives can help achieve this goal. By investing in their workforce's skill development, companies can adapt more effectively to market shifts and capitalize on new opportunities. It's essential for businesses to recognize the need for a unified approach that combines people, processes, and technology to drive growth and performance. Training programs tailored to the demands of digitalization can help realize this comprehensive strategy. Furthermore, organizations that provide opportunities for professional development are more appealing to potential hires and are better equipped to retain their existing talent. As global economies evolve, the demand for ongoing learning and skill enhancement is increasing. This rise is driven by the need for competencies in complex problem-solving, critical information evaluation, creative thinking, effective people management, work organization, emotional intelligence, sound judgment, decision-making, negotiation skills, and mental agility to adapt to new and changing circumstances. To meet job expectations and remain relevant, to employees.

Strategic HR Role's and uncovering Skill Gaps

Organisational goals in minds; HR can conduct a competency skill gap analysis to guide a development effort because it is difficult to clear about future workforce should look like. As per the future needs HR leaders develop a roadmap through strategic workforce capabilities with the long-term objectives. Although a continuous learning does improve employee engagement i.e.; more monitoring and developing, more solutions on root causes or clear the responsibilities and accountabilities at all levels. technologies have made it easier than ever to bring flexible and scalable learning opportunities to employee's virtual workshops and on demand training modules are two examples of technologies that facilitating reskilling and upskilling. HR's role is to identify and implementing the right learning technology that align with the organisation's need and provide an Immaculate learning experience.

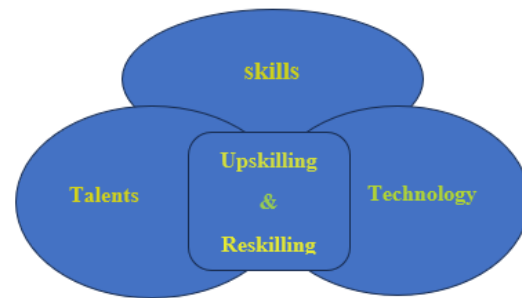
Build Learning into the Organizational Culture

HR leaders can promote learning skills by finding and removing any barriers to learning to career advancement. Organisations are design and pursue their own training program so that they demonstrate the organisation commitment to learning; once training has been chosen and facilitated it is just as

important to provide opportunities for the team, to practice their new skills.

Leveraging Learning Technologies

Technology has made it easier than ever flexible and scalable learning opportunities to employees. Virtual workshops and on demand training modules are two examples of technologies that facilitate reskilling and upskilling. HR's role is to identify and implement the right learning technologies that align with the organisation need and provide a seamless learning experience; by prioritizing continuous learning and professional development, HR empowers employees to adapt, innovate and thrive in the future of work. Embracing reskilling and reskilling is not just a strategic move it is an investment in the growth and sustainability of the organisation and its workforce.



1.1 Research Gap

Although numerous studies highlight the essential role of reskilling and upskilling in ensuring market relevance and competitiveness for employees and business. It has created a significant skill gap and rendered exiting skills obsolete. worker in the traditional sector or IT Industry have the skill needed to adapt a digital technology. The traditional sector will find it difficult to complete in the digital era; without proper training workers in this sector are at risk of being marginalized by technological advances. This poses a problem for organisation as they strive to remain competitive and meet the changing environment of market. Therefore, there is an urgent need for organisation to address the problem, by implementing comprehensive upskilling and reskilling programs that equip the employees with the skills required to thrive in the ever-changing IT service landscape.

1.2 The objective of the Study:

I) To determine the challenges faced by the manufacturing industry in implementing upskilling and reskilling.

II) To Measure the effectiveness of upskilling and reskilling programs in improving employee performance, engagement, retention, and productivity.

III. RESEARCH METHODOLOGY

This research report was written utilizing both primary and secondary research approaches. The secondary approach refers to data acquired from previously published or unpublished sources. The research utilizes a mixed-methods strategy that includes a literature review and questionnaire research. To gather information on the potential obstacles related to employee upskilling and reskilling, a survey will be undertaken among

manufacturing organizations or It Industry, the survey's questions will be made to collect both quantitative and qualitative data, including information about the kinds of reskilling and upskilling programs available, the difficulties encountered in putting such programs into action, and the success of such programs. Based on the number of manufacturing/IT organizations in the study area, the sample size will be decided. The strategy uses statistical techniques to extract useful qualities of workers' preferences, abilities, and performance from domain data. The study strategy monitors and improves AI-powered training courses to ensure their performance and relevancy. New data and insights are added to AI models periodically. To meet changing learning needs and settings, algorithms are enhanced. Businesses may improve staff flexibility and adaptability by carefully building and delivering AI-driven training courses.

Key Differences: Impact -Traditional Sector vs IT Sector in Technological Transformation

Aspect	Traditional Sector	IT Sector
Definition	Industries such as manufacturing, agriculture, textiles, construction, etc.	Industries focused on information technology, software, computing, and digital services.
Pace of Transformation	Slower – Change is often incremental due to legacy systems, physical infrastructure, and workforce adaptability.	Faster – Rapid adoption of new technologies is common (e.g., AI, cloud computing, DevOps).
Nature of Transformation	Mostly mechanical or operational – e.g., automation of machines, use of robotics, ERP systems.	Mostly digital and data-driven – e.g., cloud platforms, AI/ML, cybersecurity, software development.
Investment in Technology	Conservative – High cost of upgrading machinery or retraining staff can slow innovation.	Aggressive – Tech companies often lead innovation and invest heavily in R&D.
Impact of Transformation	Improves productivity, quality, and efficiency in production or services.	Drives disruption, scalability, and new business models (e.g., SaaS, platforms).
Workforce Impact	Requires reskilling for automation and digital tools; more resistance to change.	Workforce is typically tech-savvy and more adaptable to change; continual learning culture.
Technology Examples	CNC machines IoT for predictive maintenance, SCADA systems - ERP software	Cloud computing AI & machine learning Agile & DevOps Cybersecurity tools

3.1 Findings

Manufacturing Sector (Key Trends & Statistics Reports) 5-year (roughly 2020-2025) data / trends about upskilling & reskilling in the manufacturing and IT sectors, especially in India. Data is a mix of published surveys & secondary sources.

Year / Period	Employees Needing Reskilling	Implication for HR / Reskilling-Upskilling

2024-2025	<p>More than 50% of Indian manufacturers are prioritizing investments in “lifelong learning / upskilling” in recent years. For example, PwC’s report says 52% of top executives in leading manufacturing companies are allocating investment to building a culture of lifelong learning.</p> <ul style="list-style-type: none"> • From ZipDo (2025): 40% of manufacturing firms have virtual/online training platforms already in use. 60% of manufacturers expect a significant skills gap in the next 5 years. • A large number (68%) have increased their investment in employee training in the past 2-3 years. 	<p>HR in manufacturing is recognizing that skills will need to shift due to automation, digitalization, new manufacturing technology. The trend is toward more investment, more use of virtual training, awareness of future gaps.</p> <ul style="list-style-type: none"> • Lifelong digital learning, partnerships.
2020-2023	<p>Many manufacturing companies report that employees are underprepared; e.g., only 35% of manufacturing employees feel confident in their digital skills. ZipDo</p> <ul style="list-style-type: none"> • 42-48% of manufacturing workers need reskilling to operate newer technologically advanced equipment. ZipDo+1 • 65% of manufacturing companies have implemented or are planning digital upskilling programs. 	<p>Earlier on, many firms had gaps in readiness; HR needed to plan large-scale reskilling for shop-floor / equipment operators, not just supervisory or managerial staff.</p>
Future expectations (next3-5 years)	<p>54% of manufacturing companies expect significantly increased investment in upskilling over the next five years. WifiTalents</p> <ul style="list-style-type: none"> • Demand for skills in robotics, data analysis, AI has been rising, and is expected to dominate training investments. ZipDo+1 • Difficulties in recruiting people with digital skills is a reported barrier for 48-60% of manufacturing firms. WifiTalents+1 • Reskilling programs are reported to increase productivity (20-21%) in many firms that have them. 	<p>HR must align reskilling/upskilling programs with technology adoption (automation, robotics, AI), plan for recruitment plus internal development, measure productivity gains, anticipate shortages of digitally skilled people.</p>

IT / Technology Sector

Year / Period	Employees Needing Reskilling	Implication for HR / Reskilling-Upskilling
2022	<p>86% of Indian businesses reskilled IT workers to respond to the growing tech skills gap. US English</p> <p>Many firms are pulling talent from other sectors (e.g. manufacturing, education, business service support) into IT roles like cloud computing, data protection, IT technicians.</p>	<p>HR in IT must often source internally and cross-sectorally, not just recruit fresh. Reskilling is very active as a strategy.</p>
2023-2025	<p>8% of IT job roles in 2023 require skills that did not exist five years earlier. ZipDo</p> <ul style="list-style-type: none"> • Many IT managers (67% in one survey) report difficulty finding candidates with the “right skills,” so they are increasing focus on internal reskilling. ZipDo • 53% of IT organisations report having a dedicated budget for reskilling/upskilling programs. ZipDo • 54-65% of IT employees have participated in at least one upskilling program in the past year (depending on survey/source). 	<p>HR departments in IT are increasingly formalising budget, planning, and programs for continuous learning. There is pressure to stay ahead of new tech. Employee participation is up.</p>
2024-25	<p>85% of Indian professionals plan to invest in upskilling in FY25. The Economic Times</p> <ul style="list-style-type: none"> • Confidence in job retention has dipped; many employees see upskilling as necessary to protect against tech disruption. The Economic Times • Employers are under pressure to sponsor / facilitate upskilling; however, less than a quarter fully sponsor it. The 	<p>Reskilling/upskilling is increasingly viewed not just as “nice to have” but as essential from both employee and employer perspectives. HR needs to consider sponsorship models, incentives, structured programs.</p>

3.2 Implications for HR Strategies and Impact

HR-driven upskilling and reskilling are now core to organizational agility, competitiveness, and digital transformation in both manufacturing and IT, a trend that continues to accelerate with each year

- HR needs to forecast skills gap proactively, particularly for digital, automation/robotics, data / AI skills.

- Must build structured upskilling/reskilling programs, with budgets, delivery channels (online, blended), tracking metrics.
- For IT: invest in internal talent mobility, enabling employees to move to newer roles rather than always hiring externally.
- For manufacturing: pay attention to lower-skilled / mid-skill workers (shop floor, operators), as many of them report inadequate training.
- Incentivization (career growth, promotions) tied to learning; employee participation rises when HR supports / sponsors and recognises the upskilling.
- Monitor ROI: productivity gains, retention, filling of hard-to-fill roles, reduction in external hiring.
- Supportive organizational environments—where HR prioritizes learning, rewards skill growth, and aligns with business objectives—significantly boost outcomes.
- Cross-sector partnerships, government incentives, and collaboration with educational institutions broaden the reach and impact of upskilling programs.

IV. CONCLUSIONS

The transformation brought about by modern technologies is not a temporary trend but a permanent shift. For manufacturing and IT industries alike, upskilling and reskilling must be embraced as core pillars of organisational strategy. The future belongs to those who invest in their people—and HR stands at the centre of that transformation.

In the IT sector, transformation is particularly intense. Technologies such as generative AI, cloud-native systems, cybersecurity, and low-code platforms are rendering traditional skill sets obsolete at an unprecedented pace. The World Economic Forum estimates that more than 50% of all employees will need reskilling by 2025, and nowhere is this more visible than in tech. IT organisations that rely solely on external hiring are struggling to meet the demand for emerging skillsets. As a result, HR leaders are pivoting to internal talent development, creating agile learning ecosystems that enable current employees to evolve into new roles. Structured reskilling programs, digital learning platforms, and career progression

models based on skill acquisition are becoming the norm.

In manufacturing, the shift is equally dramatic. Industry 4.0 technologies—including smart automation, predictive maintenance, and digital twin simulations—are transforming factory floors and requiring a different kind of workforce. Traditional hands-on roles now demand digital literacy, data interpretation skills, and the ability to operate or maintain intelligent systems. The challenge for HR is twofold: not only must it upskill existing employees to handle digitally enabled processes, but it must also reskill those whose roles are becoming redundant due to automation. Manufacturers investing in workforce transformation are reporting significant returns, including improved productivity, quality control, and employee retention.

Despite these opportunities, several challenges persist. Budget constraints, employee resistance to change, limited digital access (particularly in remote manufacturing facilities), and difficulty in measuring learning outcomes continue to hinder large-scale reskilling efforts. HR departments must overcome these obstacles through a combination of strategic foresight, leadership buy-in, technology-driven learning tools, and partnerships with educational institutions and edtech platforms.

Ultimately, both sectors are converging on a common reality: skills are the new currency in the digital economy. Competitive advantage increasingly depends on how fast an organisation can adapt, and adaptation is only possible when people are enabled to learn, unlearn, and relearn. HR's role, therefore, extends beyond managing talent to actively shaping it. By integrating upskilling and reskilling into long-term business strategies, organisations can ensure workforce relevance, agility, and resilience in the face of continuous technological disruption.

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