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Reskilling and Upskilling for A Future-Ready Workforce: A Systematic Literature Review

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Abstract

Rapid technological advancements, particularly artificial intelligence (AI), automation and digital transformation, are continuously changing job roles and skill requirements. In this context, reskilling and upskilling have emerged as important approaches for developing a future-ready workforce and addressing persistent skill gaps. This study reviews literature on reskilling and upskilling to identify major themes, emerging trends, key drivers, challenges and strategies influencing workforce skill development. It synthesises scholarly research and reports from international organisations to examine how employers, employees, education providers and policymakers respond to changing skill requirements. The reviewed literature indicates that technological transformation, changing job roles, skill shortages and the growing emphasis on lifelong learning are major drivers of workforce development. Effective approaches include digital and blended learning, personalised training, work-based learning, industry–academia collaboration, organisational support and continuous learning cultures. However, limited access to training, financial constraints, outdated curricula, resistance to change and unequal digital opportunities continue to constrain implementation. The review highlights that technical training alone is insufficient: future-ready workers also require analytical thinking, communication, creativity, adaptability and ethical judgement. It proposes an integrated framework connecting skills intelligence, inclusive learning design, workplace application and outcome evaluation. The paper contributes by bringing technological, organisational and human dimensions together and identifying directions for inclusive, adaptable and sustainable workforce strategies.

Keywords: Reskilling; Upskilling; Future-ready workforce; Lifelong learning; Digital transformation

1. INTRODUCTION

The world of work is undergoing a sustained transformation. Artificial intelligence, robotics, data analytics, cloud computing, digital platforms and the transition to more sustainable production are changing how tasks are performed and how organisations create value. These developments can improve productivity and create new occupations, but they can also reduce demand for some tasks and make existing knowledge less

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relevant. As a result, the central workforce challenge is not simply whether jobs will disappear or emerge; it is whether people and institutions can adapt quickly and fairly to changing skill requirements.

The World Economic Forum's Future of Jobs Report 2025 estimates that labour-market transformation will affect a substantial share of jobs by 2030. It reports that employers expect nearly 40% of skills required at work to change and identify skill gaps as a major barrier to business transformation (World Economic Forum [WEF], 2025). These projections should be understood as employer expectations rather than certain forecasts, but they illustrate why workforce learning has become a strategic priority.

Reskilling and upskilling are related but distinct responses. Upskilling develops or deepens skills needed in a person's current role or career path. Reskilling prepares a person to undertake a different role, occupation or set of responsibilities. Both approaches may involve technical skills, digital literacy, transferable capabilities and changes in professional identity. Their effectiveness depends on more than course availability: employees need time, motivation, support, relevant learning content and opportunities to apply new capabilities.

The issue is especially important for emerging economies such as India, where digital adoption coexists with a large informal workforce, uneven access to quality education and significant differences in organisational training capacity. Cabral and Dhar (2019), in their systematic review of skill-development research in India, highlight persistent concerns including mismatch between education and workplace requirements, uneven training quality, limited in-house training and the need for stronger coordination among institutions. These concerns make it important to view workforce development as a shared responsibility of employers, educational institutions, government and workers.

This review therefore considers reskilling and upskilling as an ongoing system rather than a one-time training event. It focuses on the drivers of skills change, the approaches used to support learning, the barriers that limit participation, and the ways outcomes can be evaluated. The central argument is that a future-ready workforce requires a balanced combination of technical capability, human skills, inclusive access and organisational systems that reward learning.

2. OBJECTIVES

The overall objective is to synthesise literature on reskilling and upskilling and explain how these approaches contribute to workforce readiness in a changing economy.

- To identify the major drivers increasing the need for reskilling and upskilling.
- To examine common learning approaches and organisational strategies used to develop workforce skills.
- To identify barriers that affect participation, completion, transfer of learning and equitable access.
- To discuss the roles of employers, employees, education providers and policymakers.

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- To propose an integrated framework and future research directions for workforce development.

3. CONCEPTUAL BACKGROUND

3.1 Reskilling and upskilling

Upskilling generally involves improving performance or extending capability within an existing occupation. Examples include an accountant learning advanced spreadsheet modelling, data visualisation or AI-supported analysis, or a teacher learning to use a learning-management system. Reskilling involves preparing for a substantially different set of tasks, such as an administrative employee moving into customer-success analytics after completing training in data tools, communication and problem-solving. In practice, the boundary is not always sharp: a role may evolve enough to require both deeper existing skills and new capabilities.

3.2 Future-ready workforce

A future-ready workforce is able to learn continuously, respond to technological and organisational change, and apply knowledge responsibly. Readiness is not synonymous with advanced technical expertise alone. The International Labour Organization (ILO, 2026) emphasises that employers increasingly need combinations of technical skills with digital literacy, social capabilities and critical thinking. Human skills remain essential because many jobs require judgement, collaboration, empathy, creativity and the ability to handle uncertain situations.

3.3 Lifelong learning and human capital

The concept of human capital helps explain why investment in knowledge and skills can improve individual productivity and economic opportunity. However, learning opportunities are not distributed equally, and returns depend on whether skills are recognised and used. Lifelong learning broadens the idea beyond formal education to include workplace experience, peer learning, short courses, vocational training and self-directed study. The ILO’s Skills and Lifelong Learning 2030 strategy places learning within a wider agenda of decent work, resilience, inclusion and sustainable development (ILO, 2023).

4. RESEARCH METHODOLOGY

This paper adopts a structured literature-review approach with thematic synthesis. It draws on peer-reviewed research relevant to skills development and workforce learning, together with reports and policy publications from recognised international organisations. The emphasis is on conceptual and practical insights that explain the relationship between technological change, skill requirements and workforce development. The review is secondary in nature; it does not collect primary data from employees or organisations.

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4.1 Search scope and sources

Relevant material was identified through scholarly publishing platforms and search engines, alongside publications from the ILO, OECD and World Economic Forum. Priority was given to sources with a clear connection to workforce skills, transparent institutional authorship or identifiable publication details. The review includes foundational work where useful and more recent evidence to reflect current digital and AI-related developments.

4.2 Inclusion and thematic analysis

Sources were considered relevant when they addressed at least one of the following: drivers of changing skill demand; approaches to adult or workplace learning; barriers to participation; organisational or policy responses; or outcomes associated with training and skills recognition. General commentary without a clear connection to workforce learning was given lower priority. The selected literature was read thematically, with findings grouped into five areas: drivers of change, learning strategies, implementation barriers, stakeholder responsibilities and evaluation of outcomes.

4.3 Methodological limitation

The present paper is a structured thematic review rather than a registered, exhaustive systematic review with a fully reproducible database export and PRISMA screening log. It does not claim a fixed number of included studies or a statistical meta-analysis. Before journal or conference submission, the authors should run and document searches in the databases required by the target outlet, record search dates and screening decisions, and add a flow diagram if strict systematic-review reporting is expected. This transparent limitation prevents the review from overstating the completeness of its evidence base.

5. REVIEW OF LITERATURE

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1. Ling Li. Reskilling and Upskilling the Future-ready Workforce for Industry 4.0 and Beyond (2024).

Ling Li examined the importance of reskilling and upskilling in the context of Industry 4.0 and technological transformation. The study discussed the changing skill requirements arising from advanced manufacturing, digital technologies and the increasing use of automation. The author emphasised that lifelong learning should become a strategic priority for organisations and individuals. The study also highlighted the importance of making training opportunities accessible and affordable. This research is directly relevant to the present study because it explains how continuous skill development can prepare employees for changing job roles and emerging workplace demands.

2. Clement Cabral and Rajib Lochan Dhar. Skill Development Research in India: A Systematic Literature Review and Future Research Agenda (2019).

Cabral and Dhar conducted a systematic review of 45 articles published between 2004 and 2017 to examine skill development in India. Their study identified the importance of connecting education and training with industry requirements. The authors highlighted challenges such as the mismatch between theoretical knowledge and practical skills, inadequate workplace training, insufficient incentives and the need for qualified trainers. They also discussed institutional support and the role of skill development in technology adoption and women's empowerment. The study provides an important Indian perspective for the present research by demonstrating that effective reskilling and upskilling require coordination between educational institutions, employers and policymakers.

3. Diganta Chakrabarti. Future of Work and the Importance of Upskilling in India (2022).

Chakrabarti examined the changing nature of work and the growing importance of upskilling in the Indian context. The study discussed anticipated skill gaps, evolving job roles and the need for workers to develop capabilities suited to future employment requirements. It also considered the responsibilities of different stakeholders in the upskilling process. The study is relevant to the present research because it connects future workforce challenges with the need for planned skill development in India. It also supports the argument that employees, employers and educational institutions must work together to improve workforce adaptability.

4. Margaret E. Beier and colleagues. Workplace Learning and the Future of Work (2025).

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Beier and colleagues examined workplace learning in response to technological advances, changing job demands and demographic shifts. They argued that traditional organisation-centred training approaches should be complemented by a person-centred perspective that recognises individual learning needs and career aspirations. The study emphasised lifelong learning, self-directed development and the importance of ensuring that workers have opportunities to acquire new capabilities throughout their careers. It also drew attention to the difficulties experienced by vulnerable workers who may have limited access to training resources. This study contributes to the present research by highlighting the importance of employee participation, learning opportunities and inclusive workforce-development practices.

5. J. Köhler and colleagues. Work Characteristics or Workers' Characteristics An Input-Process-Output Perspective on Informal Workplace Learning of Blue-Collar Workers (2021).

This study investigated informal workplace learning among blue-collar workers in small and medium-sized businesses. Using data from 702 workers, the researchers examined how individual characteristics and workplace conditions influence learning. The findings indicated that curiosity, learning orientation, self-directed learning and social support were positively associated with informal workplace learning. The study also linked informal learning with outcomes such as newly acquired competencies and job involvement. These findings are relevant to the present research because they show that reskilling and upskilling do not occur only through formal courses; employees can also develop skills through practical experience, peer interaction and support from supervisors.

6. The authors of Employment 5.0: The Work of the Future and the Future of Work (2022).

This systematic literature review examined 68 scholarly publications from 2011 to 2022 concerning the impact of digital transformation on employment. The review discussed technological unemployment, job polarisation, wage inequality and the changing relationship between technology and human work. It identified the need for education reform and investment in reskilling and upskilling as part of the transition towards new forms of employment. The study is relevant to the present research because it places workforce skill development within a wider social and economic context and demonstrates the importance of considering both technological change and its consequences for workers.

Synthesis of the reviewed studies

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The reviewed literature indicates that reskilling and upskilling are essential for responding to technological transformation and changing employment requirements. Li (2024) emphasises continuous learning in Industry 4.0, while Cabral and Dhar (2019) highlight skill mismatches and institutional challenges in India. Chakrabarti (2022) focuses on the future of work and the Indian upskilling context. Beier and colleagues (2025) emphasise individual learning needs and inclusive workplace development, while the study of informal learning among blue-collar workers demonstrates the importance of practical experience and social support. The Employment 5.0 review broadens the discussion to include employment inequality and the wider effects of digital transformation.

Taken together, these studies suggest that effective workforce development requires a combination of technical training, transferable skills, workplace learning, organisational support and collaboration between employers and educational institutions. However, differences in research context and approach indicate the need for further synthesis of the technological, organisational and human factors influencing reskilling and upskilling. The present study addresses this need by bringing these dimensions together in a review focused on developing an inclusive and future-ready workforce.

6. THEMATIC FINDINGS AND DISCUSSION

6.1 Major drivers

The reviewed literature points to five connected drivers. First, technological change alters task content and creates demand for digital, analytical and AI-related skills. Second, changing business models require employees to work across functions, platforms and customer channels. Third, demographic and environmental transitions create demand for new technical and service capabilities. Fourth, persistent skill shortages encourage organisations to develop existing employees rather than depend entirely on external recruitment. Fifth, employees increasingly need adaptable skills to maintain employability across career stages. These drivers reinforce one another: technology changes work, new work changes skill needs, and skill shortages increase pressure for continuous learning.

6.2 Approaches with practical promise

Several approaches recur across the literature. Skills-gap analysis links training to tasks and organisational priorities. Personalised learning pathways help workers focus on capabilities they need rather than complete generic courses. Work-based learning, coaching and mentoring connect knowledge to performance. Micro-credentials and modular programmes can make learning more manageable, provided the credentials are credible and portable. Apprenticeships and industry projects help learners gain practical experience. Finally, career guidance and internal mobility make learning more valuable by showing employees how new skills can lead to different opportunities.

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No single approach suits every occupation. A cybersecurity specialist may need formal technical certification and repeated practical exercises, whereas a frontline service employee may benefit from role-play, coaching and digital-tool practice. Managers may need leadership development alongside data literacy. Programme design should therefore start with the job context, learner needs and desired outcomes.

6.3 Barriers to implementation

The most persistent barriers are financial cost, limited time, low awareness of relevant opportunities, weak managerial support, inadequate digital access and uncertainty about the value of training. Workers may hesitate to participate if training occurs outside paid hours or if successful completion offers no recognition or career progression. Small businesses may lack specialist HR teams and the resources to release employees for learning. Workers in informal, temporary or insecure employment may have limited access to employer-sponsored programmes.

Inequality is not only about whether a course is available. It also concerns who has the confidence, time, prerequisites, language support, equipment and workplace permission to benefit. OECD (2025a) highlights uneven participation in adult learning, while the ILO (2026) warns that workers in smaller enterprises, informal employment and lower-skilled groups can be underserved by existing systems. Without deliberate inclusion, training can widen existing differences because those already advantaged are often better positioned to take part.

6.4 Technical and human skills must be developed together

The literature challenges the assumption that future readiness can be achieved through technical training alone. Digital tools are most useful when employees can define problems, assess the reliability of information, collaborate across teams and explain decisions. AI adoption also creates a need for responsible data use, privacy awareness, transparency and human oversight. Communication and emotional intelligence remain important in roles involving customers, colleagues, care and leadership. The ILO (2026) similarly stresses rounded skill profiles that combine technical and foundational capabilities.

6.5 Training must be connected to opportunity

Training outcomes depend on whether workers can use new skills and whether employers recognise them. If a programme develops analytical skills but the employee has no access to relevant data or projects, learning transfer may be limited. If reskilling prepares a worker for a new occupation but no placement or transition support is available, the employment benefit may not materialise. Effective programmes therefore combine learning with work redesign, recognition, career guidance and fair access to suitable roles.

7. An Integrated Framework for a Future-Ready Workforce

Based on the reviewed themes, this paper proposes a four-stage framework for workforce development:

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1. **Stage 1: Anticipate and diagnose.** Use business strategy, employee consultation, task analysis and labour-market information to identify emerging roles and skill gaps. Distinguish skills that need deepening from capabilities required for occupational transition.
2. **Stage 2: Design inclusive learning pathways.** Set measurable learning outcomes and choose suitable methods: short digital modules, formal courses, coaching, simulations, apprenticeships or project-based learning. Consider accessibility, language, work schedules and prior experience.
3. **Stage 3: Apply and recognise learning.** Give learners opportunities to practise on real tasks, receive feedback and demonstrate competence. Recognise skills through portfolios, assessments, credentials or expanded responsibilities, and connect learning to internal mobility where possible.
4. **Stage 4: Evaluate and improve.** Assess participation, completion, skill gain, application at work, employee experience, mobility and business outcomes. Use the evidence to update learning pathways and reallocate resources.

The framework treats reskilling and upskilling as a cycle rather than a linear activity. Evaluation should feed back into skills diagnosis, while employees should be involved throughout the process. The framework also emphasises that training is one part of a wider system: job design, technology access, leadership, career pathways and labour-market institutions determine whether skills are put to productive use.

8. IMPLICATIONS FOR STAKEHOLDERS

8.1 Employers and HR managers

Employers should integrate skills planning with business strategy, make training time part of paid work where feasible, and use managers to support learning transfer. Training budgets should not be judged only by enrolment or completion rates. Organisations should track whether employees can perform tasks more effectively, move into emerging roles, improve service quality or reduce avoidable errors. Employers should also ensure that AI-related training includes responsible use, data protection and verification of outputs.

8.2 Employees

Employees can strengthen their resilience by regularly reviewing the skills required in their occupation, seeking feedback, maintaining a record of demonstrated capabilities and pursuing manageable learning goals. They should balance technical learning with communication, critical thinking and collaboration. Individual responsibility, however, should not be used to transfer all costs and risks to workers: employers and public systems play a central role in providing accessible opportunities.

8.3 Educational and training institutions

Universities, colleges and training providers should strengthen links with employers while maintaining transferable foundations. Curriculum review, practical assignments, internships, faculty development and

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modular credentials can help learners transition between education and work. Providers should assess demonstrated competence rather than rely exclusively on attendance or course completion. Career guidance can help learners identify realistic pathways and avoid investing in programmes with weak labour-market relevance.

8.4 Policymakers

Governments can support inclusive lifelong learning through quality standards, targeted financial assistance, career services, recognition of prior learning and coordination among employers and providers. Public policy should pay particular attention to small enterprises, informal workers, rural communities, persons with disabilities and groups with limited access to digital infrastructure. Partnerships can share training costs and provide common resources where individual employers cannot deliver specialised programmes alone.

8.5 Implications for India

For India, a future-ready workforce strategy needs to connect digital growth with equitable access to training and employment transitions. The scale and diversity of the workforce mean that a single delivery model is unlikely to be sufficient. Urban technology workers may need advanced AI, cybersecurity or data capabilities, while workers in manufacturing, retail, agriculture, logistics and public services may need a combination of digital literacy, equipment operation, customer interaction and problem-solving. Regional-language resources, flexible schedules, practical training and recognition of informal learning can make programmes more accessible. Collaboration among industry, educational institutions and public skill-development bodies is essential to avoid fragmented efforts.

9. EVALUATION MEASURES

Evaluation should examine the whole learning pathway. Input measures include budget, instructor capacity and learning hours. Process measures include participation, completion, learner satisfaction and accessibility. Learning measures include assessment scores, demonstrations and credential attainment. Transfer measures assess whether new skills are applied at work, while outcome measures consider internal mobility, retention, productivity, quality, innovation and employee confidence. Equity measures should compare participation and outcomes across relevant groups without exposing personal data.

A balanced scorecard can prevent organisations from treating course completion as the final result. For example, a programme to train staff in data analytics could measure whether participants complete the modules, interpret a dataset accurately, use analysis in a real decision and report improved turnaround time. The appropriate measures depend on the purpose of the programme and should be agreed before training begins. Where feasible, evaluation should compare outcomes over time and consider other factors that may influence performance.

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10. RESEARCH GAPS AND FUTURE DIRECTIONS

First, more longitudinal research is needed to determine whether skill gains persist and lead to career mobility, wage progression or improved job quality. Many evaluations focus on immediate satisfaction or course completion, which are incomplete indicators of long-term value. Second, studies should examine how AI changes specific tasks and which combinations of human and technical skills support effective human–AI collaboration.

Third, research should investigate unequal access to learning by gender, age, disability, geography, educational background, employment status and firm size. Fourth, more evidence is needed on small and medium-sized enterprises, informal work and sectors outside large formal organisations. Fifth, researchers should compare learning formats and identify when digital, classroom, blended, apprenticeship or coaching approaches work best. Finally, studies should explore the recognition and portability of micro-credentials and skills gained through informal or non-formal learning.

Future reviews can improve methodological transparency by publishing complete search strings, databases, date ranges, inclusion criteria, screening decisions and quality-appraisal procedures. Where evidence is sufficiently comparable, meta-analysis may estimate the effects of particular interventions. Otherwise, transparent thematic synthesis can explain why programmes succeed or fail across different settings.

11. CONCLUSION

Reskilling and upskilling are central to preparing workers for a labour market shaped by AI, automation, digitalisation and wider economic and environmental change. The literature reviewed in this paper shows that workforce readiness depends on more than technical courses. It requires accurate skills diagnosis, accessible learning pathways, practical application, recognition of acquired capabilities and ongoing evaluation. Analytical thinking, communication, creativity, adaptability and ethical judgement complement digital and technical expertise.

The review also shows that training opportunities remain uneven. Financial constraints, limited time, outdated curricula, weak organisational support and unequal digital access can prevent workers from benefiting from learning. Employers, employees, educators and policymakers therefore need coordinated responsibilities. Employers should create opportunities to apply skills; education providers should connect learning with workplace needs; employees should engage in lifelong learning; and policymakers should support quality, access and recognition.

A future-ready workforce is not created by a single programme or technology. It emerges from a sustained learning ecosystem in which skills are anticipated, developed, used and recognised. The proposed

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framework offers a practical way to connect these stages and provides a basis for future empirical research on inclusive and sustainable workforce transformation.

REFERENCES

1. Beier, M. E., Saxena, M., Kraiger, K., Costanza, D. P., Rudolph, C. W., Cadiz, D. M., Petery, G. A., & Fisher, G. G. (2025). Workplace learning and the future of work. Industrial and Organizational Psychology, 18(1), 84–109. https://doi.org/10.1017/iop.2024.57

2. Cabral, C., & Dhar, R. L. (2019). Skill development research in India: A systematic literature review and future research agenda. Benchmarking: An International Journal, 26(7), 2242–2266. https://doi.org/10.1108/BIJ-07-2018-0211

3. Chakrabarti, D. (2022). Future of work and the importance of upskilling in India. https://doi.org/10.1177/26314541221089988.

4. Decius, J., Schaper, N., & Seifert, A. (2021). Work characteristics or workers' characteristics? An input-process-output perspective on informal workplace learning of blue-collar workers. Vocations and Learning, 14, 285–326. https://doi.org/10.1007/s12186-021-09265-5

5. Li, L. (2024). Reskilling and upskilling the future-ready workforce for Industry 4.0 and beyond. Information Systems Frontiers, 26, 1697–1712. https://doi.org/10.1007/s10796-022-10308-y

6. Employment 5.0: The work of the future and the future of work (2022). Technology in Society, 71, Article 102086. https://doi.org/10.1016/j.techsoc.2022.102086

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