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Research Paper on Reskilling and Upskilling in the Digital Era: Challenges and Opportunities

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Abstract - The digital era has brought major changes to the way people work and the skills they need to succeed in their careers. With the rapid growth of technologies such as artificial intelligence, automation, data analytics, and digital platforms, many traditional job roles are changing, while new career opportunities are being created. In this changing environment, reskilling and upskilling have become important for both employees and organizations. This study focuses on understanding the challenges and opportunities associated with reskilling and upskilling in the digital era. It examines how learning new skills and improving existing ones can help employees adapt to technological changes, improve their job performance, and create better career opportunities. The study also explores some of the common challenges faced by employees and organizations, such as lack of time, training costs, resistance to change, limited access to suitable learning programs, and the difficulty of keeping up with rapidly changing technologies. The study highlights the importance of organizations supporting employees by providing continuous learning opportunities and creating a workplace culture that encourages skill development. Overall, reskilling and upskilling can help employees remain relevant and confident in a changing job market while enabling organizations to build a skilled, adaptable, and productive workforce. The study aims to provide useful insights into how continuous learning can support both employee growth and organizational success in the digital era.

Keywords: Reskilling, Upskilling, Digital Era, Employee Development, Digital Transformation, Skill Development, Workforce.

INTRODUCTION

The digital era has fundamentally altered the nature of work. Organisations are adopting artificial intelligence (AI), machine learning, cloud platforms, automation, enterprise software, data analytics, cybersecurity systems, digital communication tools and remote collaboration technologies. These developments are not limited to information technology companies. Banking, education, manufacturing, healthcare, retail, logistics, professional services and public administration increasingly depend on digital systems. Consequently, the skills that employees need to perform their jobs are changing faster than traditional training cycles.

The World Economic Forum's Future of Jobs Report 2025 estimates that 39% of workers' existing core skills may be transformed or become outdated by 2030. The same report identifies skills gaps as the leading barrier to business transformation, with 63% of surveyed employers citing them as a major obstacle. It also reports that 59 out of every 100 workers may require reskilling or upskilling by 2030.

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Digital transformation therefore creates a dual challenge. On one side, technology can displace or redesign tasks and occupations. On the other side, technology can create new roles, improve productivity and enable employees to perform higher-value work. The central question is not simply whether technology will replace workers, but whether workers, organisations and institutions can develop the capabilities needed to work effectively with changing technologies.

Reskilling and upskilling are two important responses to this challenge. Upskilling strengthens or expands skills required for a current role. Reskilling prepares a person for a different role by developing a new skill set. Both are connected to lifelong learning because skills can no longer be considered permanently acquired at the point of graduation.

The OECD similarly argues that digitalisation is changing the demand for skills and that effective labour-market transitions require targeted retraining pathways. Its analysis of millions of online job postings identifies growing demand for areas such as data analysis, machine learning, data visualisation and digital skills.

BACKGROUND AND CONCEPTUAL OVERVIEW

Meaning of Reskilling

Reskilling is the process through which an individual acquires a new set of skills that enables movement into a different job, function or occupational pathway. For example, an administrative employee may learn data analytics and transition towards a reporting or business-analysis role. A traditional marketing executive may acquire search-engine optimisation, social-media analytics and digital advertising capabilities and move into a digital marketing role.

Meaning of Upskilling

Upskilling refers to enhancing existing capabilities so that an employee can perform a current or closely related role more effectively. Examples include an accountant learning advanced spreadsheet automation, a teacher learning learning-management systems, or a sales executive learning customer analytics and CRM automation. Upskilling is generally associated with vertical or adjacent capability development, while reskilling often involves a larger occupational transition.

Difference between Reskilling and Upskilling

Basis	Upskilling	Reskilling
Meaning	Improves or expands existing skills	Develops new skills for a different role
Purpose	Improve current-role performance	Enable career/occupational transition
Skill distance	Usually adjacent to current role	May be substantially different

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Example	Advanced Excel to Power BI	Customer service to data analyst
Typical outcome	Higher productivity, promotion, specialisation	Redeployment, career transition, employability
Employer role	Role-based learning and development	Career pathways and internal mobility

Why Reskilling and Upskilling Matter

- Rapid technological change makes previously sufficient skills less valuable or incomplete.
- AI and automation change tasks within jobs rather than only eliminating whole occupations.
- Digital skills increasingly complement domain expertise.
- Employees who continuously learn can improve employability and career mobility.
- Organisations can reduce skill shortages by developing internal talent.

REVIEW OF LITERATURE

World Economic Forum (2025)

The Future of Jobs Report 2025 provides a global assessment of employer expectations for the 2025–2030 period. It reports that broadening digital access is expected to transform business for 60% of employers, while AI and information-processing technologies are expected to transform 86% of employers' businesses. The report further states that 85% of employers plan to prioritise upskilling their workforce.

OECD – Skills for the Digital Transition (2022)

The OECD analysed millions of online job postings across several countries to identify changes in demand for digital occupations and skills. It highlights growing importance of advanced data-analysis skills, machine learning, data science, data visualisation and social-media skills. Importantly, the study demonstrates that labour-market data can be used to design targeted retraining pathways between declining and growing occupations.

OECD – Future-Ready Adult Learning Systems (2019)

The OECD emphasises that digitalisation, globalisation and demographic change require adult learning systems that are flexible, inclusive and aligned with labour-market needs. The report identifies dimensions such as urgency, coverage, inclusiveness, flexibility, guidance, alignment with skill needs, perceived training impact and financing. These dimensions are useful for evaluating the effectiveness of national and organisational reskilling ecosystems.

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OECD – Trends in Adult Learning (2025)

The OECD's 2025 analysis reports that adult-learning participation remains stagnant or declining in many countries and that much training is short or compliance-oriented. Such training may be insufficient for rapidly changing skill requirements. The report therefore strengthens the argument for sustained, job-relevant and accessible learning rather than one-time training interventions.

OECD – Digital Economy Outlook

OECD analysis of digital skills stresses that individuals need foundational digital capabilities, ICT skills and complementary skills. It also highlights the increasing value of communication, emotional intelligence and problem solving. This supports a blended model in which technical skills and human skills are developed together.

OECD – Barriers to Training (2026)

Recent OECD policy work identifies barriers that prevent adults from participating in training even when opportunities exist. Barriers can occur before enrolment, during decision-making and after training begins. Policy measures such as training leave, career guidance, financial incentives, flexible formats and inclusive learning environments can reduce these barriers.

Higher Education and Adult Reskilling

OECD research on adult learners in higher education argues that higher education institutions can contribute to reskilling and upskilling for digital and green innovation. This suggests that colleges and universities should not limit their role to initial degree education; they can become continuing-learning hubs through certificates, micro-credentials, industry partnerships and flexible programmes.

RESEARCH GAP

Existing literature strongly establishes the importance of skill development in the digital economy. However, several gaps remain relevant for organisational and academic research.

Many studies examine digital skills at a macro level but provide less attention to how individual employees perceive barriers to continuous learning.

Technology-focused studies sometimes understate the role of communication, resilience, creativity and adaptability.

Training participation does not automatically mean training effectiveness; research should examine perceived application of skills at work.

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Employees may value learning but still fail to participate because of time, cost, workload and lack of organisational support.

Organisations often invest in courses without establishing clear career pathways or measuring post-training outcomes.

Research combining employee readiness, perceived benefits, organisational support and barriers can provide a more complete view of reskilling and upskilling.

The present study addresses these gaps by combining conceptual analysis with an illustrative employee survey framework. The quantitative section demonstrates how perceptions of digital learning, barriers and career outcomes can be analysed.

STATEMENT OF THE PROBLEM

The rapid adoption of digital technologies has created a mismatch between existing workforce capabilities and emerging organisational requirements. Employees are increasingly expected to understand digital platforms, data, AI-enabled tools, cybersecurity practices and technology-supported workflows. However, access to training is unequal and many employees face constraints related to time, cost, workload, lack of guidance and inadequate employer support.

If this skills gap persists, organisations may experience difficulty filling emerging roles, lower productivity from technology investments, employee anxiety, higher recruitment costs and increased risk of workforce displacement. At the individual level, outdated skills may reduce employability and career mobility.

Therefore, there is a need to examine how employees perceive reskilling and upskilling, what motivates them to participate, what barriers prevent participation, and how organisational support can improve the effectiveness of digital learning.

OBJECTIVES OF THE STUDY

To examine the importance of reskilling and upskilling in the digital era.
To identify the digital and human skills perceived as most important for future employability.
To assess employees' perceptions regarding the effect of upskilling on job performance.
To examine whether reskilling is perceived to improve employability and career mobility.
To identify the major barriers that prevent employees from participating in reskilling and upskilling programmes.
To assess the role of employer support in encouraging continuous learning.
To examine the perceived usefulness of online and blended learning methods.

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ISSN: 2278-0181
Vol. 14, Issue 11, CONFLUENCE - 2026

To provide suggestions for employees, organisations, educational institutions and policymakers.

Scope of the Study

The study focuses on working-age learners and employees who are exposed to digital transformation in their work. It covers technical skills such as AI, data analytics, cybersecurity and cloud computing as well as human skills such as communication, adaptability and critical thinking. The analysis is designed for academic demonstration and can be adapted to a real field survey.

RESEARCH QUESTIONS

Research Questions

What digital skills are perceived as most important in the current workplace?

Do employees believe upskilling improves job performance?

Do employees believe reskilling improves employability?

What barriers most strongly restrict participation in training?

How important is employer support for continuous learning?

Is online learning perceived as a convenient method for skill development?

RESEARCH METHODOLOGY

Research Design

The study follows a descriptive and analytical research design. Descriptive analysis is used to summarise respondent characteristics, skill priorities, barriers and attitudes. Analytical techniques are used to examine the relationship between training participation and perceived employability.

Sources of Data

Secondary data are obtained from reputable institutional publications, particularly the World Economic Forum and OECD. Primary-data analysis is demonstrated using an illustrative survey dataset. No claim is made that the 150 observations represent an actual field survey.

Sample Size and Sampling

For the illustrative model, the sample size is set at 150 respondents. A real study may use convenience, purposive, stratified or simple random sampling depending on the target population and access. For an institutional employee study, stratified sampling by sector, age or experience can improve representation.

Research Instrument

A structured questionnaire is proposed with three parts: demographic information; exposure to reskilling/upskilling; and statements measured on a four-point Likert scale (1 = Strongly Disagree, 2 =

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International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 14, Issue 11, CONFLUENCE - 2026

Disagree, 3 = Agree, 4 = Strongly Agree). A four-point scale avoids a neutral midpoint and encourages respondents to indicate the direction of their opinion.

Statistical Tools

- Frequency and percentage analysis for demographic and categorical variables.
- Weighted mean for Likert-scale statements.
- Cross-tabulation for training participation and perceived employability.
- Chi-square test of association for the illustrative hypothesis.
- Ranking analysis to identify the most important skills and barriers.

DATA ANALYSIS AND INTERPRETATION

The following analysis is based on an illustrative sample of 150 respondents. Percentages are calculated using 150 as the denominator unless otherwise stated.

Age-wise Distribution

Age group	Frequency	Percentage
18–25	54	36.0%
26–35	48	32.0%
36–45	30	20.0%
46–55	13	8.7%
56+	5	3.3%

Interpretation: The largest group is 18–25 years (36.0%), followed by 26–35 years (32.0%). This gives the illustrative sample a relatively young profile and is useful for examining attitudes towards digital learning. However, actual field research should ensure that age groups are represented according to the target population.

Gender Distribution

Gender	Frequency	Percentage
Male	79	52.7%
Female	68	45.3%
Prefer not to say	3	2.0%

Interpretation: The illustrative distribution contains 52.7% male respondents, 45.3% female respondents and 2.0% respondents preferring not to say. The near-balanced representation supports comparison, although the present paper does not attempt gender-based causal inference.

Educational Qualification

Qualification	Frequency	Percentage
Undergraduate	47	31.3%
Postgraduate	72	48.0%
Professional qualification	21	14.0%
Other	10	6.7%

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Interpretation: Postgraduates constitute the largest category at 48.0%, followed by undergraduates at 31.3%. This suggests that the illustrative sample contains respondents with substantial exposure to formal education and may therefore be relatively familiar with online learning resources.

Work Experience

Experience	Frequency	Percentage
<2 years	39	26.0%
2–5 years	44	29.3%
6–10 years	36	24.0%
11–15 years	18	12.0%
>15 years	13	8.7%

Interpretation: Respondents with 2–5 years of experience form the largest category (29.3%). The presence of both early-career and experienced respondents permits a broad view of learning requirements across career stages.

Sector-wise Distribution

Sector	Frequency	Percentage
IT/ITES	38	25.3%
Banking/Finance	25	16.7%
Education	24	16.0%
Retail/E-commerce	20	13.3%
Manufacturing	16	10.7%
Other services	27	18.0%

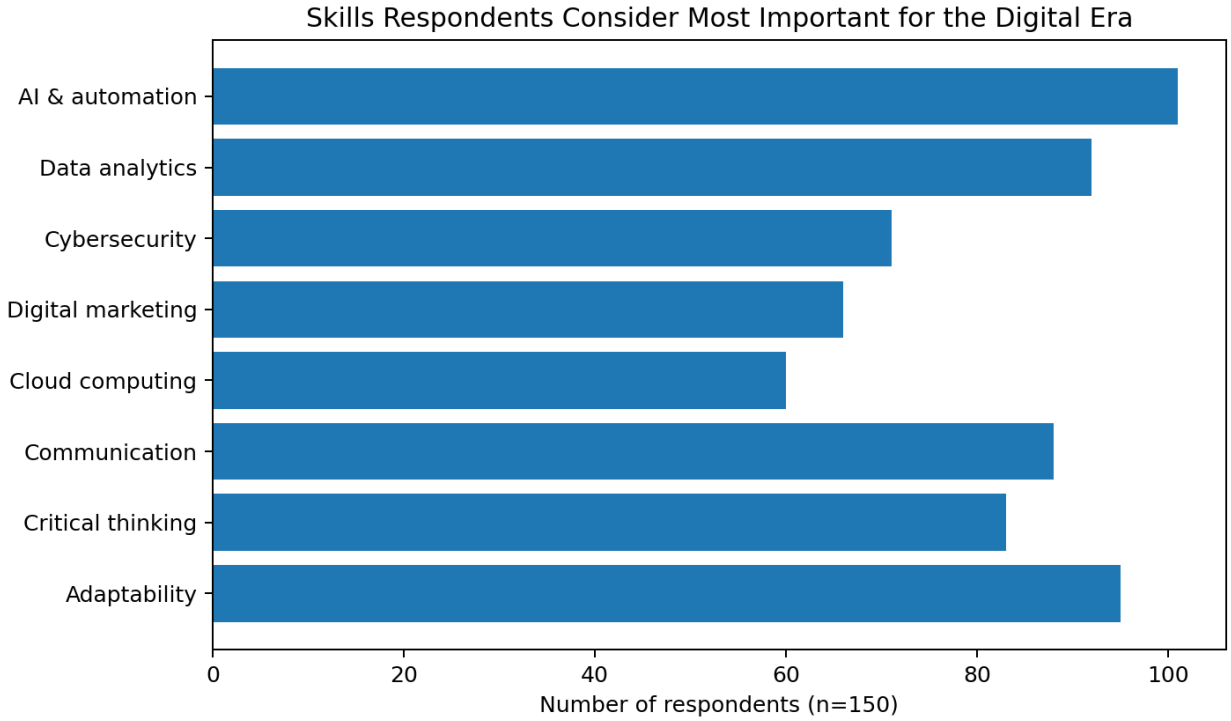
Interpretation: IT/ITES represents 25.3% of the illustrative sample, followed by banking/finance and education. The spread across sectors reflects the fact that digital transformation affects both technology-intensive and traditional industries.

Most Important Skills for the Digital Era

Skill	Frequency	Percentage
AI & automation	101	67.3%
Data analytics	92	61.3%
Cybersecurity	71	47.3%
Digital marketing	66	44.0%
Cloud computing	60	40.0%
Communication	88	58.7%
Critical thinking	83	55.3%
Adaptability	95	63.3%

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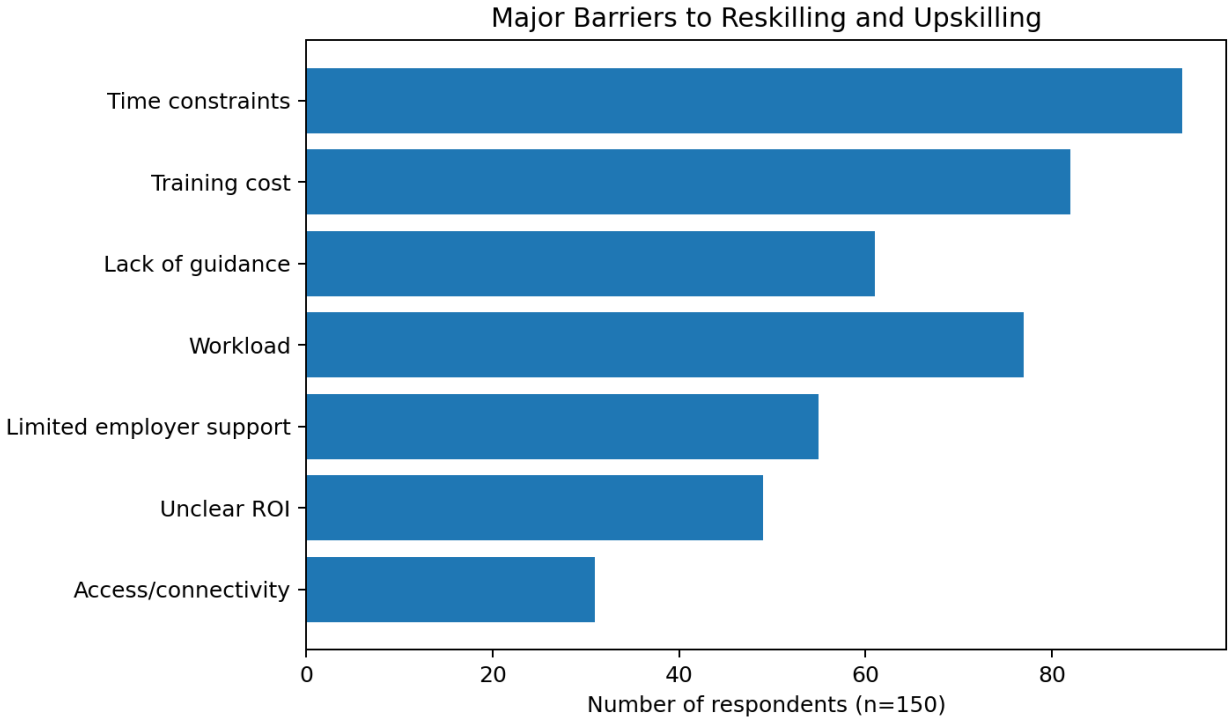
Interpretation: AI and automation are identified by 67.3% of respondents, while adaptability is identified by 63.3%. Communication and critical thinking also receive high recognition. The result supports the view that digital-era employability requires both technical and human capabilities. This is consistent with WEF evidence that AI and big data, cybersecurity and technological literacy are rapidly rising while creative thinking, resilience and adaptability remain important.

Major Barriers to Reskilling and Upskilling

Barrier	Frequency	Percentage
Time constraints	94	62.7%
Training cost	82	54.7%
Lack of guidance	61	40.7%
Workload	77	51.3%
Limited employer support	55	36.7%
Unclear ROI	49	32.7%
Access/connectivity	31	20.7%

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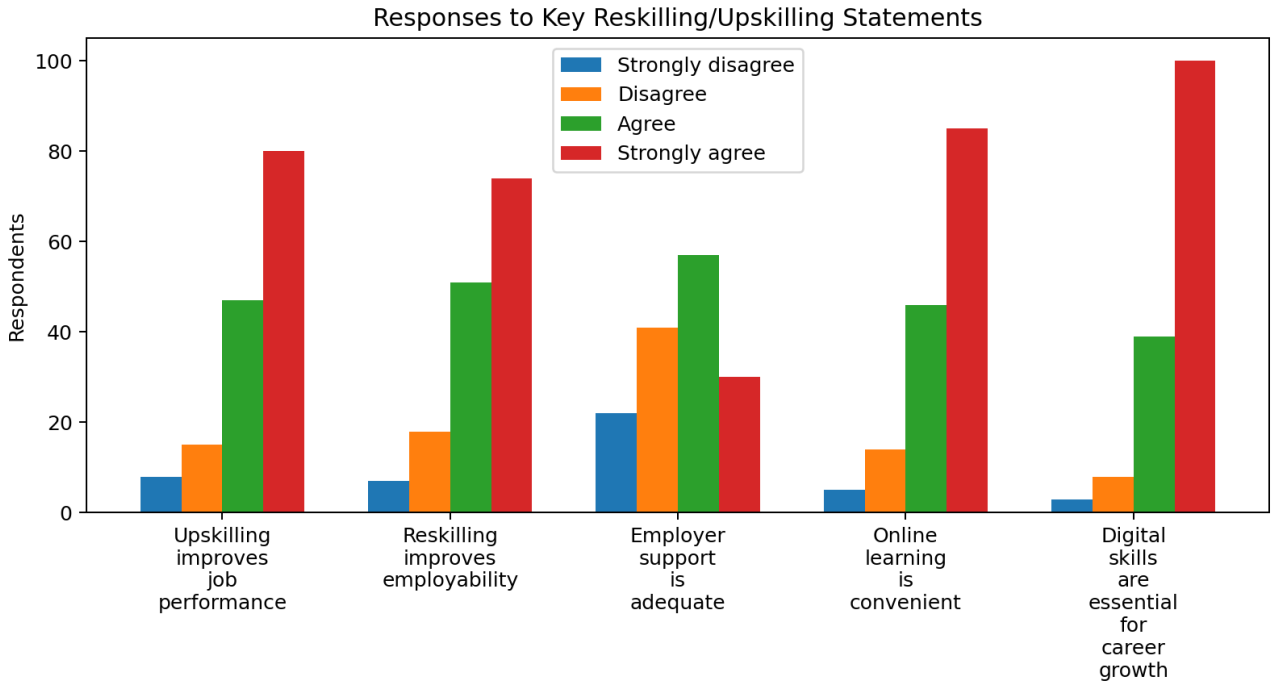
Interpretation: Time constraints are the most frequently reported barrier (62.7%), followed by training cost (54.7%) and workload (51.3%). Lack of guidance and limited employer support also affect participation. These results illustrate why merely providing training courses may not be sufficient. OECD research similarly notes that barriers can occur at multiple stages of the learning process and highlights the importance of flexible formats, guidance, training leave and financial support.

Likert-scale Analysis

Statement	SD	D	A	SA	Mean
Upskilling improves job performance	8	15	47	80	3.33
Reskilling improves employability	7	18	51	74	3.28
Employer support is adequate	22	41	57	30	2.63
Online learning is convenient	5	14	46	85	3.41
Digital skills are essential for career growth	3	8	39	100	3.57

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Vol. 14, Issue 11, CONFLUENCE - 2026



Interpretation: The highest mean score is observed for the statement that digital skills are essential for career growth (3.57). Online learning convenience records a mean of 3.41. Upskilling improving job performance has a mean of 3.33, while reskilling improving employability has a mean of 3.28. Employer support has the lowest mean (2.63), indicating that perceived organisational support is weaker than employees' perceived need for learning.

Training Participation and Perceived Employability Improvement

Training participation	Low	Medium	High	Total
Participated	9	24	67	100
Not participated	18	24	8	50
Total	27	48	75	150

Interpretation: Among respondents who participated in training, 67% fall in the high perceived-employability-improvement category, compared with only 16% among those who did not participate. This descriptive pattern suggests a strong positive association between training participation and perceived employability improvement in the illustrative dataset.

Overall Interpretation of Quantitative Results

The illustrative analysis points to five broad conclusions. First, respondents recognise that digital skills are central to career development. Second, they value both technical and human skills. Third, online learning is viewed as a convenient mechanism. Fourth, participation is constrained by practical barriers, particularly time and cost. Fifth, organisational support appears weaker than the perceived need for learning. Together, these patterns suggest that effective reskilling requires not only courses but also time allocation, financial support, career guidance, learning pathways and opportunities to apply new skills.

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ISSN: 2278-0181
Vol. 14, Issue 11, CONFLUENCE - 2026

FINDINGS

The analysis reinforces the argument that digital transformation changes the skill composition of work. WEF reports that 39% of workers' existing skill sets are expected to be transformed or become outdated by 2030, while 85% of employers plan to prioritise upskilling. The illustrative survey similarly shows high employee recognition of the importance of continuous learning.

Technical Skills and Human Skills Must Coexist

The data indicate strong demand for AI, data analytics, cybersecurity and cloud capabilities. However, communication, critical thinking and adaptability also receive high rankings. This supports the emerging view that digital transformation increases the value of complementary human capabilities rather than making them irrelevant.

Learning Must Become Continuous

Traditional education cannot fully predict the skills that employees will need throughout a 30- or 40-year career. Digital tools and job requirements can change within a few years. Consequently, employees need continuous learning cycles: assess skills, identify gaps, learn, apply, receive feedback and update again.

Organisational Support is a Critical Enabler

The relatively low illustrative mean for employer support suggests that employees may recognise the value of training but still struggle to participate. Organisations can address this by providing learning time, paid training, learning budgets, mentoring, internal mobility pathways and recognition for skill acquisition.

Online and Blended Learning

Online learning can reduce geographical and scheduling barriers. It can also support modular learning, micro-credentials and self-paced study. However, online learning should not automatically be assumed to be effective. Quality, assessment, interaction, practical application and learner support remain important.

MAJOR FINDINGS

Digital skills are perceived as essential for career growth in the digital era.

AI and automation, data analytics, adaptability and communication are among the most valued capabilities in the illustrative sample.

Most respondents agree that reskilling can improve employability and career mobility.

Online learning is perceived as a convenient method of skill development.

Time constraints emerge as the most important barrier to participation.

Training cost is another major barrier, particularly where employees must finance learning personally.

Workload can prevent employees from participating even when training is available.

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International Journal of Engineering Research & Technology (IJERT)
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Lack of career guidance can make it difficult for employees to select the right skills or learning pathway.

Perceived employer support is weaker than employees' perceived need for reskilling and upskilling.

Training participation is descriptively associated with higher perceived employability improvement in the illustrative cross-tabulation.

Organisations can benefit from internal mobility and redeployment when reskilling pathways are aligned with business needs.

Government and educational institutions have an important role in creating accessible, industry-aligned lifelong-learning ecosystems.

These findings are broadly consistent with international evidence. WEF identifies skill gaps as the leading barrier to transformation and reports that 59 out of 100 workers may require training by 2030.

SUGGESTIONS AND RECOMMENDATIONS

Suggestions for Employees

Conduct an annual personal skills audit to identify current strengths and future gaps.

Prioritise skills that are relevant to the employee's role and target career pathway rather than collecting unrelated certificates.

Develop a balanced skill portfolio covering digital, analytical and interpersonal capabilities.

Use micro-learning and modular online courses to overcome time constraints.

Build practical projects or portfolios to demonstrate newly acquired skills.

Seek mentoring and career guidance before investing heavily in a new learning pathway.

Practise new digital tools in real work situations to convert learning into competence.

Adopt a lifelong-learning mindset and regularly review changing job requirements.

Suggestions for Organisations

Create a formal skills framework linking roles to current and future capabilities.

Conduct regular skills-gap assessments using performance data, employee surveys and job-market information.

Provide protected learning time during working hours.

Introduce learning budgets, reimbursements or subscriptions for relevant programmes.

Create internal mobility pathways so reskilled employees can move into emerging roles.

Combine technical training with communication, leadership, problem solving and adaptability.

Use blended learning rather than relying exclusively on classroom or online delivery.

Measure training outcomes using skill application, productivity, quality, internal mobility and retention indicators.

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International Journal of Engineering Research & Technology (IJERT)
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Vol. 14, Issue 11, CONFLUENCE - 2026

Recognise employees who acquire and apply new capabilities.

Train managers to act as learning facilitators rather than treating training as an HR-only responsibility.

MANAGERIAL AND POLICY IMPLICATIONS

Human Resource Management

HR departments should shift from a training-delivery model to a strategic skills-management model. Workforce planning should identify which jobs are likely to grow, decline or change. Skill taxonomies can then be connected to recruitment, learning, performance management, succession planning and internal mobility.

Employee Engagement and Retention

Learning opportunities can contribute to employees' perceptions of career growth. Where workers believe that the organisation invests in their development, they may be more willing to remain and take on new responsibilities. However, learning should be meaningful and connected to career progression rather than being used merely as a compliance activity.

Productivity and Innovation

Reskilled employees can help organisations adopt new technologies more effectively because they combine organisational knowledge with new capabilities. This can reduce dependence on external recruitment and preserve institutional knowledge.

Equity and Inclusion

Access to reskilling should not be limited to highly educated employees or technology workers. Frontline, administrative, older and lower-skilled workers may face greater barriers and may require additional support. Inclusive design is therefore essential.

Policy Implication

The future of work requires coordination across employers, workers, educational institutions and government. WEF calls for collective action because the scale of expected skill disruption cannot be addressed by employers alone.

CONCLUSION

Reskilling and upskilling have become essential components of workforce readiness in the digital era. Artificial intelligence, automation, data analytics, cloud technologies, cybersecurity and digital platforms are changing not only the types of jobs available but also the tasks and skills required within existing jobs. The central challenge is therefore continuous adaptation.

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The literature shows that skill gaps are already a major constraint on business transformation. WEF's 2025 evidence indicates that 39% of workers' core skills are expected to change by 2030 and that 59% of workers may require training. OECD evidence similarly demonstrates the importance of responsive adult learning systems, targeted retraining pathways and better alignment between training and labour-market demand. □cite□turn0search0□turn0search3□

The illustrative survey analysis in this paper indicates that employees strongly value digital learning and believe that reskilling and upskilling can improve performance and employability. At the same time, practical barriers such as time constraints, cost and workload can prevent participation. The relatively lower perception of employer support highlights an important organisational challenge.

The long-term solution is not simply to provide more courses. Effective reskilling requires a complete ecosystem: skills forecasting, career guidance, accessible learning, protected learning time, financial support, practical application, assessment, recognition and internal mobility. Employees must take ownership of their development, while organisations must create the conditions that make learning possible.

LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

The quantitative dataset used in this paper is illustrative and does not represent actual respondents.

Perceptions may differ across industries, locations, age groups and occupational levels.

The analysis is primarily descriptive and does not establish causality.

Actual training effectiveness should ideally be measured using objective indicators such as productivity, performance ratings, skill assessments and promotion outcomes.

Technology changes rapidly, so skills identified as emerging today may become mainstream or change in importance over time.

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APPENDIX: ILLUSTRATIVE QUESTIONNAIRE

Title: Reskilling and Upskilling in the Digital Era: Challenges and Opportunities

Instructions: Please select the option that best represents your opinion. For the Likert statements use: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree.

Part A: Demographic Information

Age: 18–25 / 26–35 / 36–45 / 46–55 / 56+

Gender: Male / Female / Prefer not to say / Other

Educational qualification: Undergraduate / Postgraduate / Professional / Other

Work experience: <2 years / 2–5 / 6–10 / 11–15 / >15

Sector: IT/ITES / Banking & Finance / Education / Retail & E-commerce / Manufacturing / Other

Part B: Reskilling and Upskilling Exposure

Have you participated in any professional upskilling programme during the last two years?

Have you participated in any reskilling programme intended to prepare you for a different role?

What is your preferred learning mode? Online / Classroom / Blended / Self-learning

Who mainly pays for your professional training? Employer / Self / Shared / Free programme

Part C: Likert Statements

1. I regularly need to learn new digital tools to perform my job effectively.

2. Upskilling improves my job performance.

3. Reskilling improves my employability.

4. Digital skills are essential for career growth.

5. Online learning is convenient for working employees.

6. My organisation provides adequate support for learning new skills.

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7. I have sufficient time to participate in training.

8. Training costs are affordable for me.

9. I receive sufficient guidance to identify relevant skills.

10. I am confident in learning new digital technologies.

11. AI and automation skills will become important in my career.

12. Data analytics skills will improve my career opportunities.

13. Communication and collaboration remain important despite automation.

14. Adaptability is essential for future employability.

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