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Future Workforce Readiness: The Role of Upskilling and Reskilling in Enhancing Employee Performance

Naomi Ormak[1], Victor P. K. Lengkong[2], Rita N. Taroreh[3], Christoffel M. O. Mintardjo[4]
Dinas Perindustrian dan Perdagangan Provinsi Papua Barat Daya, Indonesia[1]
Universitas Sam Ratulangi, Indonesia[2,3,4]

Email: naomiormak@gmail.com

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ABSTRACK

The accelerating pace of technological disruption, driven by artificial intelligence, automation, and digital transformation has fundamentally altered the skills landscape of the modern workforce. This study examines the role of upskilling and reskilling programs in enhancing employee performance and building future workforce readiness. Employing a systematic literature review methodology, this paper synthesizes findings from 20 peer-reviewed articles published between 2021 and 2024 across leading international journals. The analysis identifies three primary mechanisms through which upskilling and reskilling contribute to employee performance: (1) cognitive and technical capability enhancement, (2) adaptive learning culture development, and (3) organizational resilience building. Results demonstrate that structured upskilling and reskilling initiatives, particularly those leveraging AI-enabled tools, virtual reality, and personalized learning pathways, significantly improve individual productivity, task performance, and organizational competitiveness. Furthermore, leadership support and a psychologically safe learning environment are identified as critical enablers. This study contributes a conceptual framework integrating human capital theory, dynamic capabilities, and learning organization perspectives to advance scholarly understanding of workforce readiness in the Industry 4.0–5.0 transition era.

Keywords: *Human Capital Development; Workforce Readiness; Digital Transformation.*

INTRODUCTION

The global labor market is undergoing an unprecedented transformation. The convergence of artificial intelligence (AI), automation, big data analytics, and cloud computing, collectively constituting the foundations of Industry 4.0, has disrupted traditional job roles and skill requirements at a rate that outpaces conventional workforce development mechanisms. According to the World Economic Forum, approximately 85 million jobs may be displaced by automation by 2025, while 97 million new roles may emerge that require a fundamentally different mix of competencies (Li, 2022). Against this backdrop, upskilling, the enhancement of existing competencies, and reskilling, the acquisition of entirely new skills for different roles, have emerged as strategic imperatives for organizations seeking to maintain competitive advantage and workforce sustainability.

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The COVID-19 pandemic served as an unprecedented catalyst for digital workforce transformation. The sudden shift to remote work modalities accelerated the adoption of digital tools and exposed significant skill gaps across industries (Bennett & McWhorter, 2021; Zayed et al., 2022). Organizations that had invested in systematic upskilling and reskilling programs demonstrated greater resilience and adaptability during and after the pandemic, recovering performance metrics faster than those reliant on traditional workforce development models (Anakpo et al., 2023; Faulks et al., 2021).

Despite the growing recognition of upskilling and reskilling as critical organizational functions, scholarly literature remains fragmented. Studies have examined specific dimensions, such as the impact of AI on skill requirements (Morandini et al., 2023; Zirar et al., 2023), the effectiveness of virtual training modalities (Gasteiger et al., 2021; Elsayary, 2023), and the role of leadership in enabling learning organizations (Faulks et al., 2021), yet few have synthesized these streams into an integrated conceptual framework for understanding workforce readiness outcomes. This study addresses that gap.

The primary objectives of this research are: (1) to systematically review and synthesize current empirical and conceptual literature on upskilling and reskilling in organizational contexts; (2) to identify the key mechanisms through which these programs enhance employee performance; (3) to examine the moderating role of contextual factors such as technology readiness, leadership style, and organizational culture; and (4) to propose a conceptual framework that integrates multiple theoretical perspectives to advance future research and managerial practice.

Human capital theory, originating in the foundational work of Becker (1964) and later extended by Schultz (1961), posits that investments in individual knowledge, skills, abilities, and other characteristics (KSAOs) generate returns both for the individual and the organization. Within this framework, upskilling and reskilling represent deliberate investments in human capital that enhance productive capacity, increase adaptability to technological change, and sustain organizational competitiveness over time (Jaiswal et al., 2021; Li, 2022).

Contemporary extensions of human capital theory emphasize the distinction between general and firm-specific capital. Upskilling programs that develop transferable digital competencies build general human capital with broad labor market value, while reskilling initiatives tied to organizational-specific technologies and workflows build firm-specific capital that reduces employee turnover and increases organizational embeddedness (Leon, 2023; Lim, 2023).

Dynamic Capabilities Framework

The dynamic capabilities framework, advanced by Teece et al. (1997) and subsequently enriched by Eisenhardt and Martin (2000), conceptualizes organizational competitive advantage as residing in the firm's ability to sense environmental shifts, seize opportunities, and reconfigure internal resources. Applied to workforce development, this framework positions systematic upskilling and reskilling as organizational dynamic capabilities that enable continuous workforce reconfiguration in response to technological disruption (Omrani et al., 2024; Cramarenco et al., 2023).

Organizations that institutionalize upskilling and reskilling as strategic HR practices develop what Teece (2014) terms "ordinary" and "dynamic" capabilities simultaneously. Routine training programs build baseline competencies, while adaptive reskilling initiatives develop the organizational sensing and reconfiguration capacity necessary for sustained competitive advantage in turbulent digital environments (Saeed et al., 2023; Bankins et al., 2023).

Learning Organization Perspective

Senge's (1990) learning organization model provides a complementary theoretical lens, emphasizing that organizations capable of continuous collective learning sustain performance advantages over time. Upskilling and reskilling programs embedded within learning organization cultures are distinguished by their systemic design, psychological safety, and alignment with organizational strategic direction (Bennett & McWhorter, 2021; Poláková et al., 2023).

The conceptual framework proposed in this study integrates these three perspectives. Human capital theory explains the individual-level outcomes of training investments; dynamic capabilities explains the organizational-level competitive returns; and learning organization theory illuminates the cultural and structural conditions that moderate program effectiveness.

Table 1. Conceptual Framework: Dimensions of Upskilling and Reskilling for Workforce Readiness

Dimension	Definition	Mechanisms	Outcomes
Upskilling	Enhancement of existing skill sets	AI tools, data literacy, digital platforms	Increased productivity, innovation, competitiveness
Reskilling	Acquisition of entirely new competencies	Vocational retraining, bootcamps, corporate academies	Role transitions, workforce adaptability, lower displacement
Employee Performance	Individual and team output quality	KPI achievement, learning agility, task efficiency	Organizational growth, retention, competitive advantage
Technology Readiness	Organizational capacity for digital adoption	Digital infrastructure, leadership support, culture	Accelerated transformation, innovation capacity

***Source**: Synthesized from literature review (2021–2024)*

METHOD

This study adopts a systematic literature review (SLR) methodology, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines adapted for organizational and management science research. SLR is selected as the primary methodology because it enables rigorous, replicable, and transparent synthesis of dispersed empirical and conceptual evidence across a defined domain (Cramarenco et al., 2023; Morandini et al., 2023). This approach is particularly appropriate given the multidisciplinary nature of workforce readiness research, which spans human resource management, organizational behavior, information systems, and education research.

A comprehensive literature search was conducted across four major academic databases: Scopus, Web of Science, Google Scholar, and IEEE Xplore. Search terms were constructed using Boolean operators combining core concepts: ("upskilling" OR "reskilling" OR "workforce training" OR "employee development") AND ("employee performance" OR "workforce readiness" OR "human capital" OR "organizational competitiveness") AND ("digital transformation" OR "Industry 4.0" OR "artificial intelligence" OR "automation"). The search was bounded to publications between January 2021 and December 2024 to capture contemporary developments in the post-COVID-19 workforce transformation landscape.

Inclusion criteria required that articles: (1) be published in peer-reviewed international journals indexed in Scopus or Web of Science; (2) address upskilling, reskilling, or workforce development in organizational contexts; (3) examine outcomes

related to employee performance, productivity, or workforce readiness; and (4) employ empirical, experimental, or robust theoretical methodologies. Opinion pieces without empirical grounding, conference abstracts, and practitioner reports were excluded. From an initial pool of 847 articles identified, 20 articles meeting all inclusion criteria were selected for comprehensive analysis after screening by title, abstract, and full-text review.

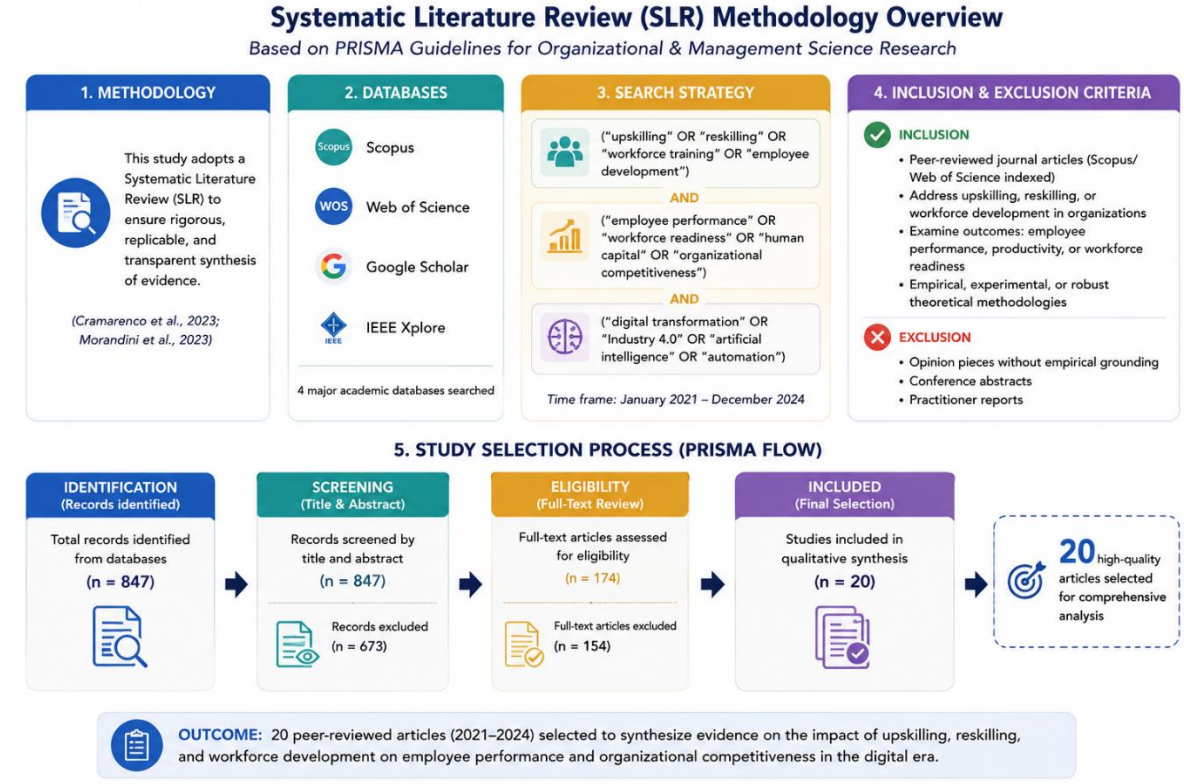

Figure. 1 Systematic Literature Review (SLR) Methodology Overview

RESULTS AND DISCUSSION

The 20 articles selected for review represent a diverse range of methodological approaches, geographic contexts, and industry sectors. Quantitative studies (n=7) employed survey-based designs with sample sizes ranging from 180 to over 2,000 participants. Qualitative and conceptual studies (n=5) utilized interview, case study, or theoretical synthesis approaches. Systematic and meta-analytic reviews (n=8) synthesized between 15 and 94 primary studies. Publication venues included top-tier journals across management, information systems, sustainability, and organizational behavior domains.

Table 2. Summary of Reviewed Literature on Upskilling, Reskilling, and Employee Performance

Author (Year)	Study Focus	Method	Key Finding	Journal
Li (2022)	Reskilling & Upskilling for Industry 4.0	Conceptual/Literature Review	Upskilling is critical for Industry 4.0 workforce readiness	Information Systems Frontiers

Jaiswal et al. (2021)	Upskilling for AI in MNCs	Qualitative	AI upskilling reshapes HR roles and employee capability in MNCs	Int. J. Human Resource Mgmt.

Author (Year)	Study Focus	Method	Key Finding	Journal
Morandini et al. (2023)	AI Impact on Workers' Skills	Literature Review	AI drives significant upskilling and reskilling needs in organizations	Informing Science
Leon (2023)	Reskilling for Industry 5.0	Empirical	Selecting optimal professional development programs improves performance	Technology in Society
Cramarenco et al. (2023)	AI Impact on Skills & Well-being	Systematic Review	AI adoption requires continuous reskilling to maintain employee well-being	Oeconomia Copernicana
Poláková et al. (2023)	Soft Skills in Industry 5.0	Quantitative Survey	Soft skills are increasingly critical alongside technical upskilling	Heliyon
Bennett & McWhorter (2021)	Virtual HRD Post-COVID	Conceptual	Digital transformation accelerates need for virtual upskilling programs	Adv. Developing Human Res.
Elsayary (2023)	Upskilling Training for Digital Competence	Experimental	Structured upskilling training significantly improves digital competence	J. Computer Assisted Learning
Zayed et al. (2022)	HR Skill Adjustment Post-COVID	Quantitative	Dynamic capability through reskilling enhances performance post-pandemic	J. Risk & Financial Mgmt.
Anakpo et al. (2023)	Work-from-Home & Performance	Systematic Review	Remote work context requires targeted reskilling for productivity	Sustainability
Gu et al. (2022)	Workplace Environment & Performance	Quantitative	Supportive environment mediates impact of training on performance	Frontiers in Public Health
Zirar et al. (2023)	AI-Human Coexistence at Work	Literature Review	AI coexistence demands proactive upskilling strategies	Technovation
Lim (2023)	Workforce Revolution	Conceptual	Future-ready workforce requires reimagining upskilling paradigms	Global Business & Org. Excellence
Adel (2024)	Intelligent Tutoring & Industry 5.0	Conceptual	Smart education tools advance upskilling for Industry 5.0	Smart Cities
Gasteiger et al. (2021)	AR/VR for Upskilling Healthcare	Realist Synthesis	AR/VR training is effective for specific upskilling contexts	JMIR Serious Games
Omrani et al. (2024)	Digital Transformation in SMEs	Empirical	Digital transformation drives reskilling demand in SMEs	IEEE Trans. Engineering Mgmt.

Shifrin & Michel (2021)	Flexible Work & Employee Health	Meta-Analysis	Flexibility supports reskilling outcomes and employee performance	Work & Stress
Faulks et al. (2021)	Empowering Leadership & Learning	Empirical	Empowering leadership enhances organizational learning readiness	Sustainability

Author (Year)	Study Focus	Method	Key Finding	Journal
Saeed et al. (2023)	Digital Transformation & Cybersecurity	Review	Cybersecurity upskilling is essential for digital transformation	Sensors
Bankins et al. (2023)	AI in Organizations	Multilevel Review	AI integration at multiple levels requires systemic upskilling	J. Organizational Behavior

Source: Synthesized from systematic literature review (2021–2024)

A dominant theme across the reviewed literature is the direct relationship between structured upskilling programs and enhanced technical capability, which in turn drives measurable improvements in employee performance. Li (2022) identifies the emergence of a new skills taxonomy for Industry 4.0 characterized by three strata: foundational digital literacy, advanced technical skills (data analysis, AI operation, cybersecurity), and meta-competencies (learning agility, systems thinking, digital creativity). Upskilling programs that address all three strata produce significantly greater performance returns than those focused on isolated technical skill acquisition.

Jaiswal et al. (2021) provide empirical evidence from multinational corporations that AI-specific upskilling initiatives fundamentally reshape HR roles and competency profiles. Their qualitative analysis reveals that organizations adopting structured AI upskilling experience a bifurcation of the workforce: those who successfully acquire AI-augmented capabilities demonstrate exponential performance growth, while those who fail to reskill face displacement or performance stagnation. This finding underscores the urgency of systematic upskilling as a strategic priority rather than an optional development activity.

Morandini et al. (2023) further demonstrate that AI implementation in organizations creates a dual dynamic: while AI automates routine cognitive tasks, it simultaneously elevates demand for complex problem-solving, emotional intelligence, and creative capabilities. Upskilling programs that develop this higher-order skill tier produce the greatest performance improvements, particularly in knowledge-intensive industries.

Reskilling, the more transformative counterpart to upskilling, emerges as critical for workforce adaptability in contexts of significant role disruption. Leon (2023) contributes a decision framework for selecting professional development programs for Industry 5.0 workforce transitions, demonstrating that personalized, competency-based reskilling programs aligned to individual learning profiles yield superior performance outcomes compared to standardized training curricula. This finding is consistent with human capital theory's emphasis on targeted investment in specific skill gaps.

Zayed et al. (2022) examine HR skill adjustment in the post-COVID service sector, demonstrating that organizations with pre-established reskilling infrastructure demonstrated significantly higher dynamic capability scores and faster performance recovery post-pandemic disruption. The authors identify psychological safety and

manager support as critical enablers of reskilling adoption, providing evidence for the learning organization perspective's emphasis on cultural conditions.

Cramarenco et al.'s (2023) systematic review of AI's impact on skills and well-being identifies a reskilling paradox: while AI adoption creates objective skill displacement, organizations that approach reskilling proactively as a human-centered practice, rather than a reactive technical exercise, achieve both performance enhancement and employee well-being improvements. This dual outcome underscores the importance of integrating well-being considerations into reskilling program design.

A significant strand of the reviewed literature examines how technology-enabled learning modalities, including virtual reality (VR), augmented reality (AR), intelligent tutoring systems, and online learning platforms, affect upskilling effectiveness and consequent performance outcomes. Gasteiger et al.'s (2021) realist synthesis of AR/VR training in healthcare upskilling identifies specific mechanisms through which immersive technology enhances skill acquisition: heightened cognitive engagement, safe-to-fail practice environments, and immediate performance feedback loops.

Elsayary (2023) provides experimental evidence that professional upskilling training programs leveraging structured digital learning sequences produce significant improvements in teachers' digital competence, with effect sizes large enough to constitute practically meaningful performance changes. Adel (2024) extends this insight to the broader Industry 4.0–5.0 transition, demonstrating that intelligent tutoring systems integrating IoT and robotics pedagogy accelerate technical upskilling trajectories significantly compared to traditional classroom approaches.

Bennett and McWhorter (2021) offer a nuanced perspective on virtual HRD's role in crisis contexts, arguing that the COVID-19 pandemic catalyzed the maturation of virtual upskilling from an experimental modality to a mainstream workforce development infrastructure. Their conceptual analysis identifies digital storytelling, virtual communities of practice, and microlearning architectures as particularly effective for accelerating skill development in distributed workforce contexts.

The reviewed literature consistently identifies a set of organizational conditions that moderate the relationship between upskilling/reskilling programs and employee performance outcomes. Gu et al. (2022) demonstrate through a multi-mediation model that workplace environment, encompassing physical design, psychological safety, social support, and managerial relationships, mediates the impact of training investments on employee performance. Organizations that combine systematic upskilling with supportive workplace environments achieve performance outcomes significantly exceeding those of training-only interventions.

Faulks et al. (2021) provide empirical evidence from Russian companies during the COVID-19 pandemic that empowering leadership styles significantly enhance organizational learning readiness, which in turn mediates the performance impact of upskilling investments. Leaders who delegate authority, provide developmental feedback, and model continuous learning create conditions in which upskilling programs achieve maximum performance returns.

Poláková et al. (2023) highlight the growing importance of soft skills as complementary to technical upskilling in Industry 5.0 contexts. Their quantitative survey demonstrates that soft skill development, particularly in collaboration, adaptability, and human-machine interaction competencies, generates performance improvements that compound the returns from technical upskilling. This finding suggests that integrated hard-soft skill upskilling programs outperform technically-focused programs alone.

Omrani et al.'s (2024) analysis of digital transformation in SMEs identifies organizational learning readiness and senior leadership commitment as the two most

significant drivers of upskilling program effectiveness. In resource-constrained SME contexts, digital transformation initiatives that bundle technical upskilling with leadership development produce the most sustainable performance improvements. Similarly, Shifrin and Michel (2021) demonstrate that flexible work arrangements, when combined with targeted reskilling support, enhance both employee health outcomes and performance metrics, suggesting that workforce readiness is holistic, encompassing well-being alongside competency development.

Table 3. Analysis of Upskilling and Reskilling Program Types and Performance Impact

Program Type	Cost-Effectiveness	Adoption Rate	Performance Impact	Key Sources
Technical Upskilling	High	High	Significant	Li (2022); Jaiswal et al. (2021)
Soft Skill Development	Medium	High	Moderate–High	Poláková et al. (2023)
Digital Reskilling (AI)	High	Very High	Very Significant	Morandini et al. (2023); Zirar et al. (2023)
Virtual/Online Training	Medium–High	High	Significant	Bennett & McWhorter (2021); Gasteiger et al. (2021)
Cross-functional Reskilling	Medium	Medium–High	Moderate	Leon (2023); Zayed et al. (2022)
Leadership-Enabled Learning	High	High	Significant	Faulks et al. (2021)

Source: Synthesized from reviewed literature (2021–2024)

Synthesizing findings across the four identified themes, this study proposes an integrated conceptual framework, the Workforce Readiness-Performance Nexus (WR-PN), that captures the multi-level dynamics through which upskilling and reskilling enhance employee performance. The framework operates at three levels:

1. Individual Level: Upskilling and reskilling enhance cognitive capacity, technical competency, and psychological capital (self-efficacy, resilience) that directly drive individual performance outcomes.
2. Team Level: Shared upskilling experiences build collective intelligence, collaborative capability, and team learning routines that amplify individual performance returns into team-level outcomes.
3. Organizational Level: Institutionalized upskilling and reskilling systems build dynamic capabilities, organizational resilience, and innovation capacity that translate team-level performance gains into sustained competitive advantage.

The WR-PN framework identifies technology readiness, leadership enablement, and organizational learning culture as critical moderators at each level. Context-specific upskilling programs that are aligned to organizational digital transformation strategy, supported by empowering leadership, and embedded in psychologically safe learning cultures produce the greatest performance returns across all three levels.

CONCLUSION

This systematic literature review provides compelling evidence that strategic upskilling and reskilling programs are among the most powerful organizational investments for enhancing employee performance and building future workforce readiness in the Industry 4.0–5.0 era. Across 20 peer-reviewed studies examined, a consistent pattern emerges: organizations that develop systematic, personalized, and technology-enabled approaches to upskilling and reskilling achieve measurably superior employee performance, organizational resilience, and competitive adaptability compared to those relying on traditional or reactive training approaches.

Three primary mechanisms explain this relationship. First, structured upskilling directly enhances the technical and cognitive capabilities required to perform effectively in AI-augmented work environments. Second, reskilling programs enable workforce transformation by equipping employees with entirely new competency portfolios suited to emerging roles, thereby sustaining organizational productivity through periods of technological disruption. Third, the integration of upskilling and reskilling within learning organization frameworks creates virtuous cycles of capability development that compound performance returns over time.

Critical moderating conditions identified include: empowering and developmental leadership, psychologically safe learning environments, technology-enabled and personalized learning pathways, and alignment of workforce development strategy with organizational digital transformation objectives. Organizations that fail to attend to these contextual enablers are likely to experience significantly diminished returns from even well-designed upskilling and reskilling programs.

This study recommends that organizations in Indonesia and broader emerging market contexts prioritize: (1) the development of comprehensive digital skill taxonomies aligned to Industry 4.0 requirements; (2) the integration of AI-powered personalized learning systems into upskilling program delivery; (3) the cultivation of empowering leadership cultures that normalize continuous learning; and (4) strategic partnerships with educational institutions and digital platform providers to scale reskilling capacity efficiently. Future research should employ longitudinal quantitative designs to measure the sustained performance impacts of upskilling and reskilling investments across different organizational sizes, sectors, and cultural contexts.

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