

Upskilling and Reskilling Strategies to Build Future-Ready Human Capital in the Era of Digital Transformation and the Industrial Revolution 5.0: A Literature Review

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ABSTRACT

Digital transformation and the Industrial Revolution 5.0 require organizations to develop upskilling and reskilling as core strategies for sustainable human capital development. Various studies have shown that structured and sustainable skills programs increase organizational productivity, competitiveness, and resilience to technological disruption. This article aims to synthesize the latest upskilling–reskilling trends and strategies, success factors, and their implications for human capital development. The method used is a descriptive qualitative literature study by reviewing journals and proceedings related to corporate strategy, adaptive HRM, and modern learning & development programs. The results of the study emphasize the importance of data-driven workforce planning, modern learning technologies, a culture of continuous learning, and adaptive leadership in supporting effective reskilling–upskilling programs. This study offers a conceptual framework for developing future-ready human capital that integrates HR strategy, digital transformation, and organizational sustainability.

Keywords: *Upskilling, Reskilling, Future-Ready Human Capital, Digital Transformation.*

1. INTRODUCTION

The changing global work landscape is currently characterized by the acceleration of digital technology, automation, and the integration of artificial intelligence (AI), transforming how organizations operate and compete. Cross-national studies confirm that corporate success in the digital era depends heavily on strategic and sustainable workforce development through upskilling and reskilling (Sundaram, 2025). In this context, skills readiness is no longer a tactical issue but rather the foundation of long-term competitive advantage.

This transformation is reinforced by the so-called future of work, driven by technological acceleration, demographic changes, and new forms of employment relationships. The concept of human capital agility has emerged as a key imperative, namely the ability of individuals and organizations to adapt through continuous reskilling and upskilling. Traditional HRD models focused on static role-based training are considered increasingly out of step with a labor market marked by skill obsolescence and new forms of work (Sthapit & Vaidya, 2025).

In the past five years, upskilling and reskilling have also emerged as key trends in modern learning and development (L&D) practices. Organizations are leveraging advanced technology to identify skills gaps, adapt training programs, and monitor employee progress, while simultaneously building a culture of continuous learning and implementing distance/hybrid learning models. This shift demonstrates the need for L&D to be innovative and adaptive to maintain organizational resilience (Milošević & Katić, 2024).

At the same time, the Industrial Revolution 5.0 demands adaptive human resource management (HRM) strategies to ensure reskilling and upskilling programs are truly effective. Research in the digital economy context shows that companies that successfully implement these programs experience increased productivity and competitiveness, provided they have managerial support, a learning-friendly organizational culture, and adaptive leadership in training planning and evaluation (Munawaroh et al., 2025). This confirms that structural and cultural aspects are as important as training content design.

Finally, several strategic studies place upskilling and reskilling as top HR priorities and at the heart of sustainable corporate strategy. Companies that implement data-driven skills transformation strategies, modern learning

technologies, and growth-oriented organizational cultures reportedly outperform their competitors (Asiedu & Tenakwah, 2025). Furthermore, global studies offer an integrated framework linking corporate strategy, digital transformation, sustainability, and human-AI collaboration to build a future-ready workforce (Sundaram, 2025).

Digital transformation driven by developments in artificial intelligence (AI), the Internet of Things (IoT), big data analytics, and automation has transformed the way organizations operate and the competencies required for their workforce. These changes not only impact business processes but also alter job structures and the skill requirements of human resources. In this context, organizations are required to have adaptive, innovative human capital capable of responding quickly to changes in the business environment to remain competitive amidst the dynamics of the global economy (Sundaram, 2025).

The concept of Industry 5.0 further emphasizes the importance of humans as the center of organizational transformation. Unlike Industry 4.0, which focused on automation and technology-based efficiency, Industry 5.0 places collaboration between humans and technology as a key factor in creating sustainable, resilient, and human-centric organizations (Leon, 2023). Therefore, the success of digital transformation is determined not only by technology investment but also by the organization's ability to develop workforce competencies that align with future needs.

A World Economic Forum report indicates that most of the skills currently in demand will undergo significant changes in the next few years due to technological developments and digitalization. This situation has led to the emergence of a skills gap, namely the gap between the competencies possessed by the workforce and the competencies required by the organization. If not anticipated, this gap can reduce productivity, hinder innovation, and diminish organizational competitiveness (Asiedu & Tenakwah, 2025).

In response to this situation, organizations have begun implementing upskilling and reskilling strategies as part of human capital development. Upskilling refers to the process of improving employee skills to support performance in their current jobs, while reskilling is the process of learning new skills that enable individuals to adapt to different roles or jobs. Both strategies are crucial instruments in preparing the workforce for changing competency needs resulting from digital transformation (Leon, 2023).

Various studies have discussed the role of upskilling and reskilling in improving workforce competency, organizational productivity, and readiness for the digital economy. However, most studies still discuss these two concepts separately and focus on improving individual skills. Furthermore, there is limited research that comprehensively synthesizes how upskilling and reskilling strategies contribute to building future-ready human capital in the context of digital transformation and Industry 5.0 (Leon, 2023).

Based on this gap, this study aims to conduct a systematic literature review on the role of upskilling and reskilling strategies in building future-ready human capital. The results are expected to provide theoretical contributions to the development of the Human Capital Development literature and provide practical input for organizations in designing sustainable human resource development strategies.

2. RESEACRH METHODS

This study employed a qualitative approach with a literature review to comprehensively analyze the role of upskilling, reskilling, and adaptive HRM strategies in the era of digital transformation. The literature search was conducted through scientific databases such as Scopus, Google Scholar, and SINTA using the keywords "Upskilling," "Reskilling," "Future-Ready Human Capital," "Human Capital Development," and "Digital Transformation." Inclusion criteria included articles published between 2022 and 2026, published in reputable journals, and relevant to the research objectives. Articles not addressing workforce competency development or unrelated to digital transformation were excluded from the analysis.

The data obtained were then analyzed to identify key themes emerging in the literature. The analysis phase included categorizing research findings, identifying patterns of relationships between concepts, and developing a conceptual synthesis regarding the contribution of upskilling and reskilling to the formation of future-ready human capital.

3. RESULTS AND DISCUSSIONS

Recent research and studies place upskilling and reskilling as a key pillar of human resource development in the digital era and the 5.0 Industrial Revolution. The following discussion explores how this strategy works, its success factors, and its relationship to human capital agility and organizational sustainability.

Various studies confirm that corporate success in the digital era depends heavily on strategic and sustainable workforce development through upskilling and reskilling. Organizations that invest in structured skills programs demonstrate higher adaptability, innovation, and sustainability (Sundaram, 2025).

In the context of the 5.0 Industrial Revolution, reskilling and upskilling have become key HR strategies to maintain workforce competitiveness amidst technological acceleration (Sthapit & Vaidya, 2025). Editorials on the future of work emphasize human capital agility—the ability of individuals and organizations to adapt through reskilling and upskilling—as a key imperative of sustainable HR strategy (Milošević & Katić, 2024).

The research shows that companies that successfully implement reskilling–upskilling programs experience increased productivity and competitiveness (Sthapit & Vaidya, 2025). However, success is highly dependent on:

- Full managerial support and adaptive leadership involvement in training planning and evaluation
- An organizational culture that supports long-term learning and growth
- Data-driven workforce planning and the use of modern learning technologies

The proposed strategic framework makes skills development no longer a tactical training exercise but a strategic investment priority to ensure sustainable competitive advantage (Munawaroh et al., 2025).

An editorial on human capital agility highlights the role of digital technology, institutional collaboration, and cross-disciplinary approaches as key enablers of reskilling and upskilling (Milošević & Katić, 2024). This aligns with findings that the integration of AI, digital tools, and human–AI collaboration is changing work dynamics and demanding a proactive learning ecosystem (Milošević & Katić, 2024).

Socially, skills transformation contributes to increased employability, reduced job displacement, and more inclusive economic growth. Empowering employees with future-ready skills is also associated with greater job security, mental well-being, and more equitable access to new opportunities (Sundaram, 2025).

On the other hand, editorials on the future of work warn that traditional, role-based HRD models are increasingly out of sync with a labor market characterized by skill obsolescence and new forms of work. Therefore, organizations need to shift to a skills- and capability-based framework that integrates technological prowess and human-centric competencies (Milošević & Katić, 2024).

A literature review shows that digital transformation has become a major factor driving changes in workforce competency requirements across various industrial sectors. Technological developments such as Artificial Intelligence (AI), Big Data Analytics, the Internet of Things (IoT), cloud computing, and automation have transformed the characteristics of jobs and the skills required by organizations. These changes have caused some skills to become less relevant, while the need for digital skills, analytical skills, creativity, problem-solving skills, and adaptability has increased. This situation has created a skills gap between the capabilities of the workforce and the needs of organizations in the era of digital transformation (Sthapit & Vaidya, 2025).

In the context of Industry 5.0, the focus of human resource development is no longer solely on technological mastery but also on the ability to collaborate effectively with technology. Skills such as analytical thinking, creative thinking, resilience, flexibility, and lifelong learning have become key competencies needed to navigate an increasingly dynamic work environment. These changes indicate that organizations require a more adaptive competency development strategy to maintain competitiveness amidst rapid technological change (Leon, 2023).

Furthermore, digital transformation also impacts various economic sectors, including micro, small, and medium enterprises (MSMEs). Many business owners still face limitations in mastering digital technology, hindering their optimal use of it. This situation demonstrates that improving human resource competency is a crucial factor in supporting the success of digital transformation and enhancing the competitiveness of both organizations and individuals (Arini & Respatiningsih, 2024).

Based on a literature synthesis, upskilling and reskilling are two primary strategies used by organizations to address changing competency needs resulting from digital transformation. Upskilling refers to the process of improving employees' existing abilities and skills to meet evolving job demands. Meanwhile, reskilling is the process of learning new skills that enables individuals to adapt to job changes or even transition to different roles (Sundaram, 2025).

These two strategies play complementary roles in human capital development. Upskilling helps organizations retain and enhance the competency of their existing workforce, while reskilling enables organizations to anticipate changes in job structure due to automation and technological advancements. Therefore, organizations not only need

training programs that focus on improving technical skills, but also on developing adaptive and sustainable competencies.

Upskilling and reskilling are important strategies for improving workforce readiness amidst increasingly rapid changes in global competency. Through these two strategies, organizations can reduce skills gaps, increase productivity, and prepare the workforce to adapt to changing business environments (Kosasih, 2025). These findings indicate that skills development is a top priority for organizations in preparing the workforce for the Industry 5.0 era (Leon, 2023).

Other studies also indicate that the successful implementation of upskilling and reskilling programs is influenced by various organizational and individual factors. One of the most dominant factors is a culture of continuous learning. Organizations that encourage lifelong learning tend to have higher levels of adaptability than those that still employ conventional competency development approaches (Milošević & Katić, 2024).

In addition to a learning culture, leadership support is also a crucial factor in the success of competency development programs. Leaders play a role in creating a work environment that supports learning, provides necessary resources, and encourages active employee participation in competency development activities. Factors such as self-efficacy, interpersonal trust, learning motivation, and collaboration between employees contribute to the successful implementation of upskilling and reskilling programs (Leon, 2023).

The use of digital learning technology is also becoming an increasingly important factor in supporting workforce competency development. E-learning platforms, learning management systems (LMS), microlearning, and artificial intelligence-based learning enable more flexible learning processes tailored to individual needs. This allows organizations to increase training effectiveness while accelerating the workforce competency development process.

Furthermore, collaboration between the government, educational institutions, and the industrial sector is a crucial supporting factor. Building a competency development ecosystem involving various stakeholders is necessary to ensure that upskilling and reskilling programs are sustainable and aligned with job market needs (Arini and Respatiningsih, 2024).

Upskilling and reskilling contribute significantly to building future-ready human capital. The concept of future-ready human capital refers to human resources with the ability to adapt to change, utilize technology effectively, and continuously develop competencies to meet future needs. In the context of digital transformation and Industry 5.0, future-ready human capital is not only determined by mastery of technical skills, but also the ability to think critically, be creative, collaborate, communicate, and learn continuously (Sundaram, 2025).

Consistent implementation of upskilling and reskilling programs can improve human capital agility, namely the ability of individuals and organizations to respond to change quickly and effectively. Human capital agility is a crucial element in facing uncertain business environments characterized by technological developments, changing customer needs, and global market dynamics. Organizations with a highly agile workforce tend to be more innovative, productive, and able to maintain a competitive advantage (Leon, 2023).

The findings of this study indicate that organizations need to view upskilling and reskilling as strategic investments in human capital development, not simply short-term training programs. Organizations that integrate competency development into their business strategies will have a workforce better prepared to face technological change and evolving market demands. Therefore, an organizational commitment to building a culture of continuous learning, strengthening collaboration with various stakeholders, and utilizing digital technology as an effective means of competency development is essential.

4. CONCLUSION

Based on the literature review, it can be concluded that digital transformation and Industry 5.0 have increased the need for adaptive, innovative human resources with continuous learning capabilities in organizations. This situation has led to the emergence of competency gaps that need to be addressed through upskilling and reskilling strategies.

The study's findings indicate that upskilling and reskilling serve not only as training programs but also as Human Capital Development strategies that play a role in building future-ready human capital. Successful implementation is influenced by leadership support, a culture of continuous learning, the use of digital technology, and active employee involvement in the learning process.

This research confirms that organizations that are able to integrate upskilling and reskilling strategies sustainably will have human capital that is more adaptive to technological change and better prepared to face future challenges.

Therefore, organizations need to make competency development a strategic investment to increase organizational competitiveness and sustainability in the era of digital transformation.

Overall, the literature demonstrates that upskilling and reskilling are not merely short-term responses to technology, but the foundation for agile and sustainable human capital development. Its success is determined by adaptive HRM strategies, modern learning technologies, a culture of continuous learning, and leadership that positions skills development as a strategic investment for the organization.

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