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Preparing Organizations for Digital Transformation: A Systematic Literature Review of Skill Development in Organizations with Practical Recommendations

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Abstract

The purpose of this study is to examine the current state of skill development for digital transformation in organizations using the Continuous Change Model (CCM). As digital and global business environments evolve rapidly, human resource development (HRD) professionals play a key role in managing change. Within skill development, the CCM highlights learning and development professionals as change agents who facilitate this continuous transformation. This study follows the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) guidelines to conduct a systematic review of the empirical literature on skill development in digital transformation. 25 journal articles published between 2012 and 2024 were analysed. The findings indicate that much of the research remains focused on identifying challenges and proposing theoretical solutions, with limited attention paid to implementing and evaluating change initiatives. Organizations face difficulties keeping pace with digital transformation, and empirical studies on the execution and assessment of skill development strategies are scarce. This study contributes to both academic and practical discussions by addressing this research gap. For HRD practitioners, it offers a comprehensive tool kit with strategies to support upskilling efforts. By identifying critical initiatives, this study provides actionable recommendations to bridge skill gaps and enhance the effectiveness of digital transformation in organizations.

Keywords

digital transformation • skill development • continuous change model • upskilling • reskilling • practitioner tool kit

Introduction

Artificial Intelligence (AI) and the Internet of Things have transformed the workplace, replaced jobs, changed work processes, and necessitated new skills (Bennett & McWhorter, 2021). Digital transformation in the workplace affects organizations in lasting ways and demands strategic shifts, alterations in work processes, and the development of new skills by employees so that organizations can remain competitive in the long term (Bennett & McWhorter, 2021; Blanka et al., 2022; Ostmeier & Strobel, 2022).

Djankov and Saliola (2018) discuss the changing nature of work by suggesting that technological processes continue to reshape work. Specifically, in organizations, digital transformation changes traditional processes, such as production, and new jobs are created through technological evolution. This changes the skillset required of employees. Cognitive and socio-behavioural skills, such as problem-solving and teamwork, as well as combinations of skill types, such as adaptability, will become in high demand, as digital technologies change the way people work. Consequently, investing in employee skill development must become a high priority for organizations and governments (Djankov & Saliola, 2018).

The success of addressing the challenges of the new world greatly depends on how quickly one manages to address skill demand. Skill development will become "a matter of lifelong learning" (Djankov & Saliola, 2018, p. 62) to address the continuously changing nature of work. In particular, the question of how to adequately manage and prepare the current and future workforce for impending changes is a top priority for human resource development (HRD) professionals to ensure adaptability in employees and continued competitive advantage for organizations.

The current environment has been shaped by frequent disruptions and changes for some time, affecting both organizations and employees. In particular, the digital age requires organizations to respond quickly to market

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disruptions and new opportunities. The overall environment is becoming increasingly complex and fast-paced. What is novel today may become obsolete tomorrow. However, while this notion has been present throughout the twenty-first century, it was further accelerated by the COVID-19 pandemic. The developments during the pandemic emphasized that new technologies and ways of working are closer than anticipated and identified the crucial need for re- and upskilling efforts to prepare for impending changes (Bennett & McWhorter, 2021; Bennett & McWhorter, 2022; Mikołajczyk, 2021).

Prior studies have primarily focused on identifying the challenges and skills required for digital transformation. For instance, Maresova and colleagues (2018) conducted a scoping review (n = 30) on the consequences of Industry 4.0, the fourth industrial revolution marked by the integration of digital technologies and AI into work and production systems and identified skill development as a frequently discussed aspect between 2014 and 2018. Similarly, Sipa (2022) analysed the literature on trends and challenges in talent management between 2001 and 2022 (n = 2,141) and found that skills, competencies, and knowledge were significant challenges. Further, Da Silva et al. (2022) conducted a systematic review (n = 93) of human resource trends in the realm of Industry 4.0. Their findings suggest that reskilling and upskilling efforts, job restructuring, and learning and training are key themes in the existing literature (Da Silva et al., 2022). Vey and colleagues (2017) found that many organizations take a relatively laissez-faire approach towards digital transformation by adopting a *wait-and-see* mentality instead of taking early action. The authors suggest that learning and development professionals play an important role as change agents during continuous transformation and can help shape the culture of continuous learning (Vey et al., 2017). Van Coller and colleagues (2021) conducted a scoping review (n = 42) on upskilling for digital transformation in the context of in-service training initiatives in the manufacturing sector and provided evidence that research in this field is still in its infancy yet emerging rapidly.

While numerous systematic reviews have underscored the critical role of skill development in digital transformation, most have primarily focused on identifying challenges and outlining the competencies required. However, a significant gap remains in understanding how organizations implement and evaluate skill development initiatives to effectively prepare their workforce for ongoing digital transformation. This gap became particularly evident during the COVID-19 pandemic, when many organizations struggled to rapidly upskill employees to meet shifting demands, highlighting the lack of structured, evidence-based strategies for adapting the workforce.

From a research perspective, few reviews have systematically examined studies focusing on digital transformation through an organizational change lens, leaving HRD practitioners with limited guidance on actionable, scalable skill development strategies. From a practical standpoint, it remains unclear how organizations move beyond theoretical discussions to successfully execute and assess skills-building initiatives. To address this gap, this study systematically reviews the state of skill development efforts in organizations from 2012 to 2024 and applies the Continuous Change Model (CCM) (Armenakis et al., 2000) to frame digital transformation as an ongoing and adaptive process. The selected timeframe ensures that the review captures the most recent trends and technological advancements, such as AI, automation, and big data analytics, which have fundamentally reshaped work and skill requirements. Research prior to 2012 may not fully reflect the rapid acceleration of digital transformation or the growing demand for upskilling, making the last 12 years particularly relevant for understanding current HRD practices.

Unlike traditional change models that focus on structured and one-time interventions, the CCM positions employees as active recipients and drivers of continuous skill development (Armenakis & Harris, 2009). This employee-centric perspective aligns with the study's focus on how organizations facilitate and sustain workforce learning in response to digital disruption. Accordingly, this study seeks to answer the following research question: What is the current state of empirical research on skill development in organizations undergoing digital transformation, as described through the lens of the Continuous Change Model?

The findings of this study intend to inform organizational development efforts in the realm of digital transformation by offering practical recommendations for HRD professionals while also identifying future scholarly research agendas related to up- and reskilling efforts.

Digital Transformation as a Continuous Change Process in Organizations

Changes in organizations often result from external factors. Forces of change include political, cultural, economic, demographic, and technological developments (Alvesson & Sveningsson, 2015). Cummings and Worley (2015) discuss the continuous change process as an important component of change in complex and uncertain environments. Weick and Quinn (1999, p. 37) describe continuous change as an "ongoing, evolving, and cumulative" process that emerges without prior intention. Hanelt and colleagues (2021) provide evidence that digital transformation is strongly associated with continuous change, which may be triggered by episodic bursts (i.e., a new, groundbreaking external event that drastically impacts and changes all prior developments). Specifically, the authors discuss that the episodic change literature frequently assumes changes in the three key phases of unfreezing, changing, and refreezing (Lewin, 1951), in a planned and

intentional manner. In contrast, continuous change processes enter a constant state of freezing, rebalancing, and unfreezing, irrespective of intention (Hanelt et al., 2021; Weick & Quinn, 1999). Changes related to digital transformation require frequent unfreezing in organizations as they open up and adapt to impending changes. Consequently, there is a notion of continuity as new developments emerge. Developments related to digital transformation and its uncertain, yet fast-paced nature provide a rationale for identifying digital transformation as a continuous change process that requires adaptation as new developments arise (Hanelt et al., 2021; Hinsen, 2023; Rogers, 2016). Similarly, Schwarzmüller and colleagues (2018) discuss digital transformation as a change process through the exploration of key themes of change in work design and leadership. Their analysis of expert interviews (n = 49) provides evidence for many key themes of change in organizations. Specifically, changes related to work life and health, the use of information and communication technology, performance, and talent management, including increased competency requirements and organizational hierarchies, were identified as key changes resulting from digital transformation (Schwarzmüller et al., 2018). Their findings provide recommendations for developing a culture of innovation and continuous learning to prepare employees for these changes (Patterson et al., 2005; Schwarzmüller et al., 2018).

Theoretical Framework

Lewin's (1951) traditional planned change model, with its sequential steps of unfreezing (strategy development), changing (design), and refreezing (implementation), provides an early foundation for understanding organizational change. However, critics argue that it assumes a relatively stable environment between change efforts and may be less suited for contemporary organizational contexts characterized by constant disruption (Burnes, 2005; Weick & Quinn, 1999). In environments marked by rapid technological advancements, such as those undergoing digital transformation, organizations face ongoing pressure to adapt and evolve continuously rather than engage in discrete episodes of change.

Therefore, the Continuous Change Model (Armenakis et al., 2000; Cummings & Worley, 2015; Lawrence et al., 2006; Weick & Quinn, 1999) was adopted as the guiding framework for this review. Continuous change occurs at "the 'edge of chaos' that exists between order and disorder" (Brown & Eisenhardt, 1997, p. 29) and takes on a more dynamic and iterative perspective that aligns more closely with the realities of digital transformation. Unlike Lewin's model, the CCM conceptualizes organizational change as an ongoing cycle of problem recognition, solution development, implementation, and feedback-driven adaptation (Cummings & Worley, 2015). This continuous, non-linear approach enables organizations to build capabilities that sustain long-term competitive advantages amid constant environmental shifts (Burnes, 2005; Cummings & Worley, 2015).

The model includes the following four phases (Figure 1) (Armenakis et al., 2000; Cummings & Worley, 2015; Lawrence et al., 2006; Weick & Quinn, 1999):

- *Definition.* Phase 1 focuses on recognizing and defining problems or challenges. This means that organizations identify the need for change to remain competitive.
- *Brainstorming.* Phase 2 addresses problem-solving and brainstorming activities. In this phase, solutions to the challenge are proposed and designed.
- *Implementation.* Phase 3 implements the change efforts or activities.
- *Evaluation.* Phase 4 addresses the measurement, evaluation, and control of the change efforts. For instance, this may include the creation of processes for continuous adaptation or support for continuous learning.

The phases are facilitated and managed by a change agent who plays a critical role in ensuring credible movement through each phase. The change agent not only guides the organization through problem recognition, solution development, implementation, and evaluation but also fosters continuous learning and adaptation across cycles of change (Armenakis et al., 2000; Cummings & Worley, 2015).

Methods

This study aimed to assess the current state of skill development efforts in organizations to establish future research directions for professionals and scholars in the field of HRD. Systematic literature reviews allow for the identification of deficiencies and trends in existing scholarly work (Aromataris & Pearson, 2014; Rocco et al., 2023). Further, Munn et al. (2018) suggested that systematic reviews support the identification of future research agendas and inform new practices. This study follows the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) review process provided by Page et al. (2021) to ensure a transparent, complete, and replicable reporting process. The PRISMA framework was selected because of its standardized approach to identifying, screening, and reporting evidence, which enhances the credibility and rigour of the review. The PRISMA review process involves four key stages: identification, screening, eligibility, and inclusion of studies. During the identification stage, comprehensive searches across multiple databases and sources are conducted to

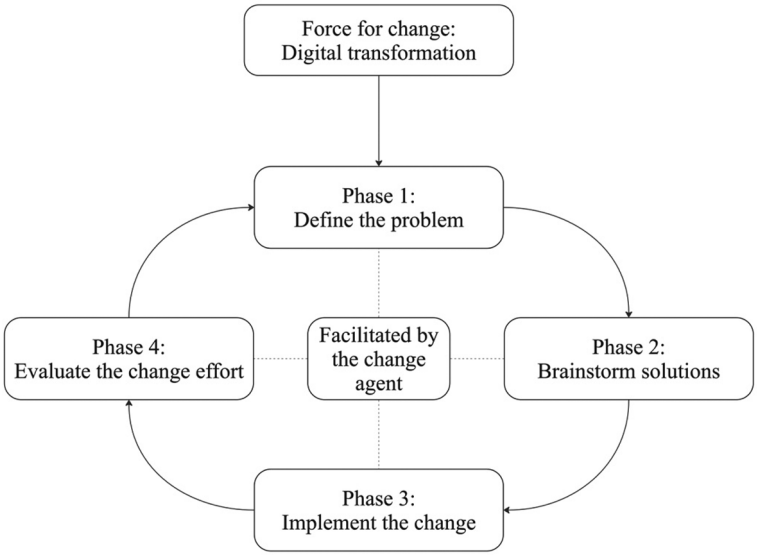

Figure 1. The Continuous Change Model in the context of this study (Adapted from Academy to Innovate HR, 2023; Armenakis et al., 2000).

gather potentially relevant studies. In the screening phase, duplicate records are removed and titles and abstracts are reviewed for initial relevance. The eligibility phase requires a full-text review to determine whether the studies meet the predefined inclusion and exclusion criteria (Page et al., 2021).

Search Strategy

The research team systematically searched the literature for publications on digital transformation and skill development in organizations. The literature search was conducted using EBSCO (Academic Search Ultimate, Business Source Ultimate, EconLit, Human Resources Abstracts, Professional Development Collection), SCOPUS, Web of Science, and APA PsycInfo. The research team used the following two strings of keywords across all eight databases to identify literature of interest: (1) 'digital transformation' OR 'digitalization' OR 'digitalisation' OR 'digitization' OR 'digitisation' AND 'skill development' OR 'competency development', and (2) 'digital transformation' OR 'digitalization' OR 'digitalisation' OR 'digitization' OR 'digitisation' AND 'upskilling' OR 'reskilling'. The literature search was limited to peer-reviewed journal articles and conference papers published between January 2012 and December 2024 to ensure a comprehensive and contemporary analysis of skill development strategies in the context of rapidly evolving digital transformation trends.

Inclusion Criteria

We included peer-reviewed journal articles on skill development efforts in the realm of digital transformation, written in English. This study focuses on re- and upskilling efforts in the context of digital transformation within organizations. Consequently, the literature was included if it specifically focused on skill and competency development efforts in organizations in the title, abstract, or the keywords. Studies from a global context were considered to capture a broad and diverse understanding of organizational skill development practices across different countries. We included qualitative, quantitative, and mixed-method studies.

Exclusion Criteria

The research team excluded articles that focused on skill development efforts at the national or industry level to maintain the study's focus on organizational efforts. Similarly, articles that only broadly discussed skill development as a solution were excluded to focus on the current state of re- and upskilling efforts. Additionally, we excluded research focusing on the development of student competencies, the increase in digital literacy, and other education-related topics. The research team also excluded articles published before January 2012 and after December 2024, systematic review articles and opinion pieces, articles without full-text access, and those published in languages other than English.

Study Selection

The first author retrieved the search results from the eight databases and removed all duplicates in May 2023, February 2024, and April 2025. After the first step, the research team screened the titles, keywords, and abstracts of the remaining articles for preliminary eligibility criteria. In the case of uncertainty, the articles were reviewed in full to determine initial eligibility. To increase the validity and reliability of the

selection process, all articles were reviewed by at least two members of the research team.

Data Extraction Process

This study examines the state of skill development in organizations through the lens of the Continuous Change Model. While the model served as a theoretical lens for data extraction and analysis, it was not applied during the search or selection process. The initial identification of studies was conducted broadly to capture a wide range of literature on digital transformation and skill development. The application of the CCM occurred only during the data extraction process, as we extracted data related to the four phases of the model. Specifically, we collected and organized data consistent with the description of each phase.

Critical Review Assessment Quality Check

The research team collaborated closely during the selection and review process. Arising challenges and uncertainties during the selection and review process were addressed in research meetings and in peer reviews. This served as a form of triangulation, further strengthening the validity and reliability of the review findings. Only articles with 100% inter-rater reliability were included in the final review.

Results

The search process yielded 89 publications on APA PsycInfo, 370 publications on EBSCO (Academic Search Ultimate), 317 publications on EBSCO (Business Source Ultimate), 49 publications on EBSCO (EconLit), nine publications on EBSCO (Human Resources Abstracts), 27 publications on EBSCO (Professional Development Collection), 438 publications on SCOPUS, and 144 publications on Web of Science. After removing duplicates and irrelevant article types, 1,037 articles were selected for the initial screening of titles, abstracts, and keywords. After removing 724 irrelevant articles, 313 articles were selected for further review. All articles were reviewed by at least two researchers to strengthen reliability and validity. During this phase, 265 articles were excluded as they did not meet the inclusion criteria. 48 articles were selected for the final review. Any potential uncertainties regarding meeting the inclusion criteria were resolved in research meetings or by an additional reviewer. 25 studies fully met the selection criteria and were included in the study. Figure 2 provides an overview of our study selection process.

A total of 25 articles were reviewed as a result of our selection process (Table 1).

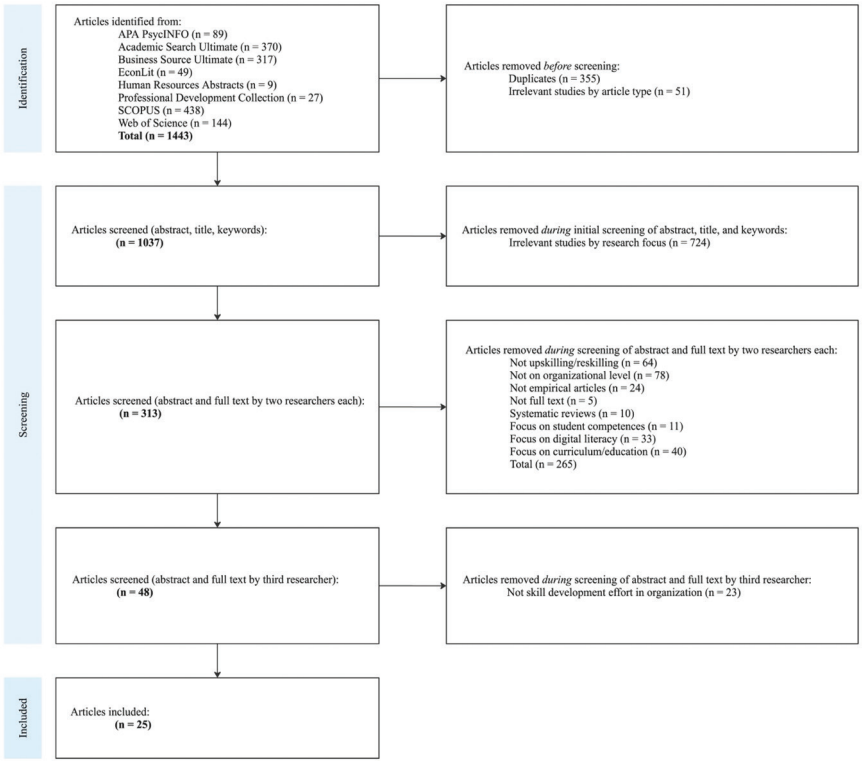

Figure 2. Identification and Selection of Articles.

Table 1. Exemplification of the Continuous Change Model (CCM) in the Reviewed Studies

Phase of the Continuous Change Model and key identifiers	Reviewed study	Description of the CCM in the study
Phase 1: Definition Focus on recognizing and defining the problem or challenge	*Ahmad & Van Looy, 2021	Explores attitudes towards skill development
	Baethge-Kinsky, 2020	Explores presence of fundamental change and re- and upskilling needs
	Carvalho et al., 2024	Identifies training needs to support digital transition
	Fonseca & Ng Picoto, 2020	Identifies digital competencies
	Gupta et al., 2022	Identifies skill development as a crucial step for organizations
	*Kar et al., 2021	Identifies factors impacting reskilling resistance
	Malik et al., 2022	Identifies the need for different skill sets due to changing job profiles
	Natrins et al., 2019	Identifies the need for organizations to frequently assess their skill requirements
	*Rakhman et al., 2024	Identifies technical and managerial competency gaps
	Rotatori et al., 2021	Explores implications of fourth industrial revolution with regards to reskilling and lifelong learning
	Sousa & Rocha, 2019	Identifies skills for digital transformation
	*van Laar et al., 2022	Identifies the need for 21st century skill development
	*Weritz, 2022	Reveals nine essential skills to perform in a changing workplace
Phase 2: Brainstorming Focus on proposing and designing solutions	*Ahmad & Van Looy, 2021	Proposes a business process management acceptance model to adopt changes
	Geraldes et al., 2021	Proposes a process to identify and solve skill development gaps
	*Gupta et al., 2023	Provides evidence for the use of change agents in change management processes
	Hansen et al., 2024	Proposes a model for content knowledge and meta-cognitive knowledge adoption to support competence development
	*Kar et al., 2021	Provides recommendations to mitigate resistance towards reskilling
	Kuchciak & Warwas, 2021	Provides a menu of solutions for up- and reskilling in organizations
	*Rakhman et al., 2024	Proposes a business solution to address competency gaps
	Rossato & Castellani, 2020	Offers ideas for skill development to remain competitive
	Shirani, 2019	Provides a skills upgrade process for organizations
	*van Laar et al., 2022	Offers a menu of organizational practices and skill development initiatives
	*Weritz, 2022	Provides implications on how to develop the workforce
Phase 3: Implementation Focus on implementing the change effort or activity	Al-Riyami & Al Subhi, 2021	Implements a digital competency development programme in an organization
	*Al Yahmadi et al., 2024	Implements an AI-driven workforce transformation tool
	*Gupta et al., 2023	Implements a structured digital transformation programme in an organization
	*Kar et al., 2021	Designs and implements a skill development programme
	Rangraz & Pareto, 2021	Presents the implementation of a transformation process
	Richardson et al., 2023	Implements a digital microlearning app to support older adults competency development
Phase 4: Evaluation Focus on measuring, evaluating, and controlling the change effort	*Al Yahmadi et al., 2024	Evaluates the AI-drive Workforce Transformation Tool's performance
	Mahohoma & Aaron, 2024	Evaluates the role of a reskilling programme on digital transformation and suggest technology-focused training programmes as next steps
	Manana & Mawela, 2022	Evaluates the barriers and enablers that support digital transformation, while also offering recommendations for continued development

Note: An asterisk (*) indicates articles that are part of multiple change phases.

Only three articles were published before 2020. 22 of the 25 articles were published between 2021 and 2024. Thirteen of the 25 articles were categorized as Phase 1 *Definition*, while only three studies were categorized as Phase 4 *Evaluation* (Al Yahmadi et al., 2024; Mahohoma & Aaron, 2024; Manana & Mawela, 2022). Additionally, seven studies addressed more than one phase, with Kar et al. (2021) discussing phases 1 (Definition) to 3 (Implementation). Figure 3 presents an

overview of the distribution of the reviewed literature across all four change phases between 2012 and 2024.

Unlike other studies categorized as Phase 1, which are limited to identifying problems or challenges, Kar et al. (2021) not only identified a lack of theories that allow us to understand the influencing factors for employees' learning behaviours in preparing for rapidly changing digital environments but also proposed solutions and implemented an intervention. To develop context-based solutions based on real-life experience, the authors applied a case study method by inviting a company that adopted new technologies to develop engineering learning and development solutions and hired digital talent for their needs. Focus groups and surveys were conducted, along with an analysis of internal data. This study identified the factors influencing employees' motives to learn and build an S-curve of reskilling resistance and an inverse S-curve of learning goals.

As an example of studies that clearly presented *Brainstorming* (Phase 2), Kuckciak and Warwas (2021) included a scientific literature review and analysis of statistical data from branch reports to present a code of good practice form and a Delphi study. Members of financial institutions from nine organizations filled out this form, and with additional analysis of text responses to the online questionnaire, this study proposed a roadmap for human resource management (HRM) in Banking 4.0, the digitally transformed banking landscape characterized by AI-driven systems, automation, and data-driven services. The roadmap suggests that consistent observation of reskilling, upskilling, and workforce reallocation could be a way to overcome the main challenges related to digitalization, regulations, and client expectations.

Six studies included descriptions of *Implementation* (Phase 3) (Al Yahmadi et al., 2024; Al-Riyamo & Al Subhi, 2021; Gupta et al., 2023; Kar et al., 2021; Rangraz & Pareto, 2021; Richardson et al., 2023). Richardson et al. (2023) focused on implementing an app-based digital microlearning intervention to determine whether this meets the organizational learning needs in terms of employees' knowledge retention and work performance. This app-based intervention was used and assessed by nursing assistants, managers, and administrative managers from three different caregiving organizations. Participants were able to use this app on either mobile or computer platforms to access competency development courses and additional learning resources, while managers monitored their progress. The authors discussed how this study expands the empirical evidence for the effectiveness of microlearning apps in employees' skill development. Further, Al Yahmadi and colleagues (2024) suggested the implementation of an AI-driven Workforce Transformation Tool to support organizations' reskilling efforts. With the help of this tool, organizations can speed up their reskilling and redeployment efforts to maintain momentum in a quickly evolving environment.

The role of Phase 4 *Evaluation* is to assess the effectiveness and disseminate the outcomes of the implemented interventions. Manana and Mawela (2022) conducted interviews with management staff, IT employees, and nontechnical employees from two government organizations

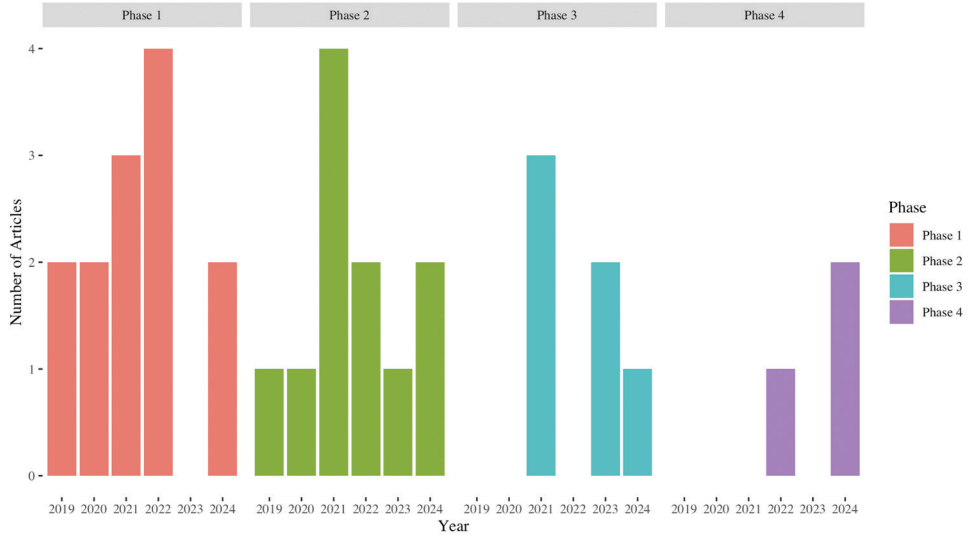

Figure 3. Overview Of Distribution of Change Phases 2012 To 2024.

Note. N = 25. The findings did not include articles published prior to 2019. The following articles are categorized as part of multiple change phases: Ahmad & Van Looy, 2021 (Phase 1 and 2), Al Yahmadi et al., 2024 (Phase 3 and 4), Gupta et al., 2023 (Phase 2 and 3), Kar et al., 2021 (Phase 1, 2 and 3), Rakhman et al., 2024 (Phase 1 and 2), van Laar et al., 2022 (Phase 1 and 2), and Weritz, 2022 (Phase 1 and 2).

to assess the status quo of their digital skills and identify facilitators and barriers for government organizations in terms of developing digital skills. Employees were also asked about their perceptions of the importance of digital transformation. The findings showed that employees demand more training and experience to develop their digital skills and believe that financial resources, technology infrastructure, and formal training would facilitate the digital transformation process. This study disseminated its evaluation findings and provided recommendations for the public sector. Recommendations include promoting a learning culture through diverse programmes, allocating funds for employee training, and managing skill gap analysis to hire new talent and reskill current employees. Similarly, Mahohoma and Aaron (2024) evaluated the role of reskilling programmes on digital transformation at a large financial services organization. The authors suggested the use of technology-based training programmes to support organizations' continuous development.

Discussion and Implications

The findings from this review indicate that while there has been substantial research on identifying skill gaps and proposing theoretical solutions (Phase 1), there is a significant lack of empirical evidence on the practical implementation (Phase 3) and evaluation (Phase 4) of these efforts. Only six of the 25 studies included in this review addressed Phase 3, focusing on interventions such as digital upskilling programmes and microlearning initiatives. Even fewer studies have examined the long-term effectiveness of these interventions, with only three studies (Al Yahmadi et al., 2024; Mahohoma & Aaron, 2024; Manana & Mawela, 2022) providing insights into the evaluation phase. This highlights the urgent need for further empirical research that moves beyond theoretical frameworks to assess the success and sustainability of skill development programmes in real-world organizational settings. The review of prior literature identified a clear need for up- and reskilling efforts (Bennet & McWhorter, 2021; Blanka et al., 2022; Ostmeier & Strobel, 2022).

Implications for Practice

From a practical perspective, talent and skill development is often identified as a key ingredient in successful change efforts. For instance, a 2018 McKinsey report provides evidence that less than 30 percent of digital transformation efforts succeed (McKinsey and Company, 2018). Select studies (Baethge-Kinsky, 2020; Shirani, 2019; Weritz, 2022) address skill development from the employees' needs perspective and present data addressing skill gaps or ways to identify employees' skill development needs. However, few studies have approached skill development from an employee-centric perspective (Gupta et al., 2022; Malik et al., 2022), as Armenakis and Harris (2009) suggested during the employee readiness assessment stage.

Consequently, equipping the workforce with the necessary skills and capabilities to succeed is crucial for both employees' success and future digital transformation change efforts. To address this, we aimed to provide a set of recommended actions to support HRD professionals throughout all four phases. This will ensure the successful implementation and evaluation of change efforts related to skill development to prepare organizations and their workforce for ongoing, continuous change processes.

Recommended Actions to Support HRD Professionals

Table 2 presents the summary of practical actionable recommendations and applicable tools for HRD professionals who are in charge of designing and implementing the support system for the workforce within the organizations.

Phase 1 of the Continuous Change Model addresses problem identification. This phase requires awareness that the change needs to happen soon, followed by the organization's desire to participate in and support the change. Participation requires the organization to provide information and knowledge to implement subsequent phases. Our results support the idea that during this initial phase, organizations gather information for preliminary assessments (Singh & Ramdeo, 2020). The key theme is the identification of organizational needs, which are often influenced by existing external trends. The self-awareness evaluation consists of three perspectives. First, what current and future skills and competencies are required (Baethge-Kinsky, 2020; Fonseca & Ng Picoto, 2020; Malik et al., 2022; Sousa & Rocha, 2019; van Laar et al., 2022; Weritz, 2022)? Second, what are employees' attitudes, such as resistance, towards skill development (Ahmad & Van Looy, 2021; Kar et al., 2021)? Third, which training and development programmes and measurements should organizations use to support employees in keeping up with ever-changing job profiles (Natrins et al., 2019; Rotatori et al., 2021). The initial stage is the process of problem identification to determine what needs to be done and how the transition is initiated. The findings resonate with Singh and Ramdeo's (2020, p. 406) *before-implementation* evaluation. In contrast to systematic changes such as mergers and acquisitions, the current study focuses on a single organization, its digital transformation, and employee development. Therefore, we recommend that HRD practitioners focus on developmental changes (Singh & Ramdeo, 2020) to initiate such organizational change. This approach targets specific skills or performance gaps between the current state and desired future goals. Building a strong developmental foundation can be a crucial building block for

Table 2. Overview of Practical Recommendations and Tools: A Practitioner Tool Kit

Phase of the Continuous Change Model	Considerations	Change Management Tools
Phase 1: Definition	• What are the current needs? • What are the skill and competency gaps between current and the desired future states? • What are general stakeholders' attitude toward the skill development? • What are the potential training and learning programmes and measurements that can be used for the change?	• Environmental scanning • SWOT analysis • Research & development • Balanced scorecard
Phase 2: Brainstorming	• How necessary is the proposed change effort? • Is the brainstormed solution an appropriate tool to address the problem? • Do we have the necessary resources and capabilities? • Are all key stakeholders of the organization on board? • Do members of the organizations feel buy-in?	• Stakeholder analysis • Kotter's 8 Step Model • SWOT analysis • Updated mission and vision

Phase 3: Implementation	• What is the nature of our change effort?
	• What are the intended outcomes?
	• How can we ensure buy-in?
	• How can we diffuse change effort throughout the organization?
		• HRM interventions
		  ○ Career planning
		  ○ Selection
		  ○ Appraisal
		  ○ Training and development
		• Active participation interventions
		  ○ Enactive mastery
		  ○ Learning through observation
		• Strategic diffusion practices
		  ○ Pilot programmes
		  ○ Opinion leaders
		• Continuous change interventions
		  ○ Self-designing organization
		  ○ Learning organization

Phase 4: Evaluation	• In what areas and to what extent can the key questions for the definition phase be answered? • In what areas and to what extent can the key questions for the brainstorming phase be answered? • In what areas and to what extent can the key questions for the implementation phase be answered? • In what areas and to what extent do changes in skill development impact organizational outcomes and employees' skill development? • In what areas and to what extent can the evaluation results contribute to the preparation for the next change?	• Anderson's Value of Learning Model • Brinkerhoff's Success Case Method • Action Research Model

large-scale changes in the future. Singh and Ramdeo (2020) suggest scanning the environment, conducting research on learning and development trends, and assessing the external forces through a balanced scorecard or an analysis of Strengths, Weaknesses, Opportunities and Threats (SWOT) to assess stakeholders' and organizations' change readiness. Once organizations have defined the change in phase one, it is crucial to move towards the second phase to commence problem-solving and brainstorming activities.

Phase 2 includes the proposal and design of the change efforts. This is consistent with the findings of the present study. All reviewed articles proposed ideas, processes, recommendations, or a list of solutions on *how to* develop the workforce (Ahmad & Van Looy, 2021; Geraldes et al., 2021; Gupta et al., 2023; Kar et al., 2021; Kuchciak & Warwas, 2021; Rossato & Castellani, 2020; Shirani, 2019; van Laar et al., 2022; Weritz, 2022). To do so, Armenakis and colleagues (2000) proposed five key questions that assist the movement through this second phase. First, it is important to discuss the need for change. Specifically, this addresses the discrepancy between the current and proposed states of change efforts. Understanding the need for change can be developed through an analysis of the internal and external environments of an organization (Nadina, 2011). For example, Ahmad and Van Looy (2021) focused on changing employees' skills. Second, organizations should deliberate whether the proposed solution is an appropriate response to an observed challenge. For instance, Emerson (2022) suggested that change management strategies often fail because of a lack of alignment between the selected solution and the organizational culture. Therefore, it is crucial to consider organizational culture and incorporate employees' skill development needs into the proposed changes. Third, the feasibility of the change effort significantly impacts its successful implementation. Consequently, organizations are encouraged to carefully review their resources and capabilities. For example, while the technical skill gap is more visible, an organization's brainstorming phase should evaluate its overall business process management needs (Ahmad & Van Looy, 2021). Additionally, organizations should determine whether they have adequate capabilities to perform continuous digital transformation changes (Weritz, 2022). Fourth, organizational support is crucial for successful problem-solving, and fifth, personal buy-in from

organization members is needed (Ahmad & Van Looy, 2021; Armenakis et al., 2000; Gupta et al., 2023).

Change efforts frequently lead to uncertainty and confusion among employees. Therefore, organizations are encouraged to share messages that build commitment to the proposed change endeavour. This allows organizations to create positive change momentum and move towards the third phase of the change process: the institutionalization of the change effort. The following are some examples of tools that can assist HRD professionals in Phase 2: stakeholder analysis to identify key stakeholders of the change efforts, Kotter's 8 step change model including a SWOT analysis, and an updated vision and organization strategy (Cameron & Green, 2019; Hughes, 2007; Levasseur, 2001).

Phase 3 addresses the implementation and institutionalization of change efforts. In this phase, organizations and change agents establish a commitment to change and decide on the implementation methods. The nature of the selected intervention depends on the desired outcome and builds on the needs assessment from Phases 1 and 2 (Singh & Ramdeo, 2020). Generally, the institutionalization of change can be achieved by feeding the five core messages of change through HRM interventions: active participation, strategic diffusion practices, and continuous change interventions to establish self-designing and learning organizations. HRM interventions target the extrinsic reinforcement of the implementation process and support the acceptance of the desired change. Examples include selection decisions, performance appraisal, compensation, and career planning as well as training and development (Armenakis et al., 2000; Singh & Ramdeo, 2020). Kampoowale et al. (2025) suggested that individual assessment results might be included in performance and goal setting with managers. Training and development efforts support employees' acquisition of knowledge, skills, and abilities to address the requirements of altered responsibilities in the workplace. Furthermore, for skill development, an emerging trend of incorporating human resource analytics into training, development, and performance management (Roul et al., 2024) can facilitate HRD practitioners' change-agent roles (Ratnam & Devi, 2024).

Active participation enhances employees' buy-ins and builds the credibility of change agents. The key component of active participation is self-discovery, which ensures learning through personal experience and exposure (Armenakis et al., 2000). Intervention examples include gradual exposure and competence building through enactive mastery, learning through observation, participative decision-making, and persuasive change communication. Lawrence and colleagues (2006) emphasize the clear communication of the change effort and the organization's strategic direction. Similarly, Çelik (2025) proposed that organizations adopt a resource-based view to empower their employees and managers. In addition to proactively communicating with employees and managers, including these stakeholders in the digital transformation decision-making process as a form of resource, advocate, and part of the change agent team is important. This will secure increased buy-in from stakeholders affected by the changes. Similarly, the strategic diffusion of change efforts contributes to successful implementation. Armenakis and colleagues (2000) suggested the use of pilot programmes and opinion leaders to support the spread and adoption of the intended change. Additionally, strategic continuous change interventions, such as the establishment of a self-designing organization or a learning organization, support the implementation of lasting change despite ever-changing conditions (Singh & Ramdeo, 2020). Self-designing organizations need to continuously diagnose and revise their desired outcomes and strategies to match current and projected future states (Singh & Ramdeo, 2020). Additionally, organizational learning, a key element of learning organizations, is characterized by a continuous learning culture and should be embedded in daily workflows to allow people to expand their skill sets continuously.

The findings of our study support the use of the suggested implementation methods. Various articles have discussed training and development efforts to support upskilling and the development of digital competencies (Al-Riyami & Al Subhi, 2021; Kar et al., 2021; Richardson et al., 2023). Gupta and colleagues (2023) implement a strategic intervention and provide evidence for the use of change champions for strategic diffusion. Additionally, two articles emphasized the importance of pilot testing (Richardson et al., 2023) and strategic work-integrated learning interventions (Rangraz & Pareto, 2021) for implementing and institutionalizing change.

Phase 4 includes the evaluation and assessment of the change efforts. Some scholars position evaluation at the end of organizational change (Cummings & Worley, 2015; Kotter, 1995), while others (Singh & Ramdeo, 2020) describe evaluation as a continuous refinement process (Coghlan & Brannick, 2014; Cooperrider & Srivastva, 1987; Kotter, 1995) to achieve an organization's goals. As a persistent activity, evaluation plays a critical role in organizational change and development processes (Singh & Ramdeo, 2020). First, the evaluation process enables organizations to reflect on themselves, both as individual employees and as a whole, compared to others, by conducting thorough evaluations. This self-awareness opportunity helps organizations alter and redesign the fundamental building blocks of their thinking patterns in the most effective ways. This type of evaluation is conducted as a *before-implementation* evaluation process and enhances stakeholders' understanding of current organizational functions and systems to diagnose problems and design interventions. Second, it not only measures outcomes and impacts but also provides opportunities for improvement

and guides interventions. Evaluation guides the intervention while it is being implemented and eventually determines how the changes work and whether they are persistent. This can be achieved through a *during-implementation* evaluation, as it provides stakeholders with insights into the immediate effects of the changes based on *before-implementation* evaluation data. This helps stakeholders understand the exact procedure of changes in the context and plan future implementation. Finally, by measuring the outcomes of interventions from multiple perspectives, evaluation allows practitioners to prove that changes and interventions add value to the organization. This *after-implementation* evaluation is critical for determining future resource allocation and reassessing, brainstorming, and implementing processes.

In particular, to support the sustainment of change in Phase 4, the change agent may play the role of an educator who focuses on building a culture of encouraging innovation. Some of the seven strategies (active participation, persuasive communication, management of internal/external information, HRM practices, diffusion practices, rites and ceremonies, and formulation activities) for active participation in institutionalizing strategies suggested by Armenakis et al. (2000) could be achieved through evaluation. In terms of managing internal/external information to create convincing messages for organizational members, the evaluation and assessment of change outcomes are used as tools for effective communication. For example, collecting organizational members' stories influenced by changes and promoting these stories allows other members to reflect on themselves and motivates them to actively participate in changes. Evaluation methods can also be applied to manage HRM practices, such as performance appraisals, compensation, and training development, as instruments for managing internal and external information. Criteria for the selection process (hiring, firing, and transferring) and future training programmes should be based on the evaluation of performance appraisals and outcomes. Moreover, evaluation can be impactful in terms of diffusion strategy. Diffusion refers to the widening changes in or outside an organization. The successful outcomes, emerging barriers, and implementation methodologies of pilot programmes will be identified and disseminated through the evaluation phases. The change agent's encouragement to diffuse best practices and the benefits of changes display strong support for organizational change.

While organizations understand the importance of organizational evaluations, constraints such as budget, time, and personnel evaluation skills, such as processing large data analytics, hinder this practice. However, frequent evaluations can potentially detect potential issues early in a rapidly changing global business environment (Singh & Ramdeo, 2020).

Implications for Theory and Future Research

This study offers several important implications for theory. First, it supports the expansion of the CCM by applying it to the context of digital transformation, highlighting its relevance in navigating ongoing adaptive changes. Future research could test the applicability of the CCM in different digital transformation contexts and industries. For instance, longitudinal studies in healthcare or manufacturing sectors undergoing AI integration to examine how continuous learning and digital upskilling are embedded within organizational routines. Second, this study reframes the role of HRD professionals as proactive change agents rather than passive facilitators. This redefinition calls for theoretical models to capture a more dynamic and interventionist HRD function, especially in technologically volatile and fast-evolving organizational environments. For example, future HRD research could explore how HRD professionals co-design and implement organization-wide reskilling initiatives in response to automation, using participatory action research methods to assess how their involvement influences employee adaptability and organizational agility. Third, the findings support a shift from an episodic to a continuous change paradigm. This highlights the need for iterative and lifelong learning processes in the realm of digital transformation. With the advent of AI, the pace and importance of upskilling have increased dramatically, requiring organizations to build agile learning systems that are capable of rapid deployment. Future research could investigate how microlearning platforms, digital badges, or learning experience platforms contribute to continuous development in fast-paced industries such as technology, finance, and logistics. Additionally, scholars might examine the speed at which organizations move through the CCM cycle, as the continuous nature of change now resembles an accelerating loop rather than a linear process. Finally, this study highlights a critical implementation gap in the existing literature. While much emphasis has been placed on diagnosing challenges and generating potential solutions, comparatively little attention has been given to the operationalization and execution of effective skill development strategies. To address this, we call for future research to move beyond the initial phases of the CCM and focus on empirical investigations of implementation and impact. For instance, Winarni et al. (2024) conducted a post-implementation evaluation of reskilling and upskilling initiatives involving 150 participants in the traditional sector. Their findings indicate that most training programmes were delivered in condensed time frames, with information technology training being more effective than soft skills training in enhancing digital readiness. The study also linked these outcomes to the organization's broader culture of continuous learning. To support sustainable transformation, the authors recommend

comprehensive approaches that integrate both technical and soft skills development, improve training accessibility, and provide sustained post-training support, especially in traditional sectors that are undergoing digitalization. This example can serve as a valuable foundation for future research to explore comparative implementation studies across industries, investigate the long-term effects of different training modalities, and assess how organizational learning cultures shape the success of digital reskilling efforts.

Limitations

First, despite retrieving data from multiple highly cited academic databases in English, the research team recognizes the limitation of not utilizing additional databases to further diversify the research findings. Second, the findings of this study are limited by the research team's understanding and interpretation of the Continuous Change Model, as not all the included studies specifically incorporated terms consistent with our definition of the four individual phases. The findings were subjected to both qualitative and collective interpretations. Third, the research team reviewed only the included studies to determine the state of skill development in organizations. Consequently, we did not assess the quality of the selected articles. Finally, the research team focused on organizational contexts and did not consider employees' self-directed upskilling and reskilling efforts, such as pursuing an advanced degree or additional training and certificates, independent of the organization.

Conclusion

This systematic literature review investigates skill development efforts in organizations in the realm of digital transformation through the lens of the Continuous Change Model. The research team reviewed 25 empirical studies qualitatively. The findings suggest that organizational skill development to address the challenges of digital transformation is still in its infancy, while emphasizing the critical role that HRD professionals play in facilitating the success of digital transformation efforts. As organizations navigate an era of rapid technological change, HRD professionals are increasingly expected to evolve into strategic change agents who address immediate skill development needs and foster a culture of continuous learning. Ensuring that employees acquire and maintain the skills needed for digital success is essential for organizational competitiveness, making it important for HRD professionals to take a proactive role in shaping these long-term learning initiatives. However, most of the reviewed studies still focused on recognizing and defining the challenge (Phase 1) as well as brainstorming solutions (Phase 2). Consequently, this suggests a need for future empirical exploration that focuses on the implementation and evaluation of change processes.

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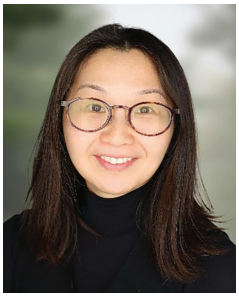
About the Authors

Viktoria Loidl
Viktoria Loidl is a PhD Candidate in Human Resource Development at the University of Illinois Urbana-Champaign in the United States. Her research examines how AI and digital transformation are reshaping the future of work, with a particular focus on sustainable careers, employee happiness, and workforce development. Drawing on mixed-methods and advanced quantitative approaches, her work integrates organizational well-being, human-AI interaction, and career development research. Viktoria's dissertation centers on developing and validating a measure of happiness within the sustainable career framework, contributing rigorous empirical tools to better understand well-being across career trajectories. In parallel, she investigates AI literacy, generative AI use in career development, and the implications of emerging technologies for employability and organizational practice. Her research has been presented at leading international conferences and recognized with multiple awards and grants. Beyond academia, Viktoria has industry experience in user research and strategy, including internships focused on the future of work and AI-enabled collaboration. With a background in Economics and European Union Studies, she brings an interdisciplinary and international perspective to her scholarship.



Dr. Ning C. Zulauf
Ning Zulauf is a Human Resource Development scholar-practitioner at the University of Illinois Urbana-Champaign. Drawing on her academic foundation in philosophy and technology management, she approaches workplace learning, career development, and leadership development through socio-cultural perspectives. As a qualitative researcher, her work centers on human experiences and examines how contextual elements shape employees' growth and development in organizational settings. Her research interests focus on human-technology collaboration, employee engagement and development, and workforce skill alignment. As a practitioner and frontline manager, she has initiated and co-led multiple AI knowledge exchange groups to foster employees' AI literacy and skill development across the University of Illinois Urbana-Champaign. Her recent work highlights how the use of AI has rapidly evolved in higher education career services since 2023, particularly in aligning college students' skill development with emerging demands in the future of work. As a scholar, she has advanced the concept of employee resource groups by reframing them as strategic leadership and organizational development tools beyond the current employee engagement and workplace inclusion scopes. Ning's work bridges research and practice and illuminates how people learn, lead, and adapt in technology enabled workplaces. Her scholarship and leadership reflect a commitment to strengthening organizational learning ecosystems and preparing the workforce for a rapidly changing world.

Dr. Jung Sun Sung
Jung Sun Sung is a Postdoctoral Researcher at the University of Illinois Urbana–Champaign. Her work bridges human resource development, instructional systems design, and program evaluation, with a focus on skill development in technology-rich environments. She brings experience evaluating federally funded STEM education and workforce development initiatives, supporting organizational learning, reskilling, and continuous improvement efforts across higher education and industry-partnered programs. Drawing on extensive applied evaluation practice and systematic review methodologies, her scholarship centers on translating evidence into actionable strategies for organizational change, informing this study's focus on continuous transformation and digital skill development.

Maha Chahine
Maha Chahine is the Outreach and Program Coordinator at the Center for South Asian & Middle Eastern Studies at the University of Illinois Urbana-Champaign. She brings extensive experience in education, administration, and community engagement, having worked as an early childhood educator, college admissions specialist, and staff member with the Champaign Unit 4 School District, as well as in her

family-owned restaurant business. Maha holds two master's degrees in education from the Department of Education Policy, Organization & Leadership, with concentrations in Human Resource Development and Diversity and Equity in Education. She earned her bachelor's degree in Lebanon, where she was born and raised. Her research focuses on diversity and inclusion for women in the Middle East and the application of equitable workplace practices to foster inclusive organizational environments.