Journal of Multidisciplinary Studies in Professional Practice
An International Peer-Reviewed Open Access Journal
OPEN ACCESS
PEER REVIEWED
CONCEPTUAL FRAMEWORK & SYNTHESIS ARTICLE

Digital Transformation and Workforce Adaptability: Rethinking Professional Competencies in an Era of Continuous Change

Devinn Shaun Giri
State University of New York at Buffalo (University at Buffalo)

Manuscript ID: JMSPP-0002-2026 • Received: 6 October 2026 • Revised: 15 October 2026 • Accepted: 7 November 2026 • Published: 10 November 2026

ABSTRACT

Digital transformation changes not only the tools professionals use but also the conditions under which they exercise judgement, learn and adapt. Existing research identifies digital competencies, adaptive performance and organisational learning, yet these perspectives are often discussed at different levels of analysis. This conceptual article develops a conditional, multilevel explanation of how digital change may lead to sustained adaptive professional practice. Using a purposive, non-systematic synthesis of scholarship on digital transformation, adaptive performance, work design, workplace learning and responsible technology governance, it distinguishes five analytically separate elements: changing task demands, competency renewal, enabling work conditions, enacted adaptive practices and sustainable outcomes. The proposed contribution is not a new inventory of skills. It is the specification of the conversion problem: newly acquired competence may fail to become responsible adaptive behaviour when workers lack discretion, opportunities to practise, reliable systems or organisational support. Seven propositions identify testable relationships, competing explanations and conditions under which the proposed pathway may fail. A hypothetical AI-supported public-service workflow illustrates the framework, and a longitudinal, multi-team evaluation design is proposed. The framework remains unvalidated; its value lies in providing falsifiable distinctions between training completion, demonstrated competence, adaptive action and longer-term organisational outcomes.

Keywords: *digital transformation; workforce adaptability; professional competence; adaptive performance; workplace learning; work design; responsible artificial intelligence*

How to cite this article: Giri, D. S. (2026). Digital Transformation and Workforce Adaptability: Rethinking Professional Competencies in an Era of Continuous Change. *Journal of Multidisciplinary Studies in Professional Practice*, 1(1), 28–39. https://doi.org/10.5281/jmspp.2026.01.002

1. Introduction and problem

Digital transformation has become a significant driver of change across professional environments, including education, healthcare, business administration, engineering, public services, finance, and research. Organisations increasingly employ digital platforms and intelligent technologies to redesign workflows, improve service delivery, support decision-making, and respond to changing stakeholder expectations. However, digital transformation is not simply the adoption of new technologies. It also involves changes in organisational structures, professional roles, communication practices, decision-making processes, and the distribution of responsibilities between people and technological systems (Vial, 2019).

The expansion of artificial intelligence, automation, data-intensive systems, and digitally mediated collaboration has intensified the need to reconsider what constitutes professional competence. Employees may be expected to interpret data, evaluate algorithmic recommendations, communicate through digital platforms, protect sensitive information, and learn unfamiliar tools while continuing to meet established performance standards. Competencies that were previously sufficient for a particular position may become incomplete as technologies and professional expectations evolve.

This situation presents a central challenge: organisations must develop workforces that can respond constructively to continuous change without compromising professional standards, employee well-being, or service quality. Adaptability is therefore more than the ability to operate a new software application. It includes recognising when existing knowledge is no longer adequate, acquiring new capabilities, transferring learning to unfamiliar situations, and modifying work practices in response to changing conditions.

Pulakos et al. (2000) identified multiple dimensions of adaptive job performance, including handling emergencies, managing work stress, solving problems creatively, learning new tasks, and demonstrating interpersonal adaptability. These dimensions remain relevant in digitally transforming workplaces because employees must frequently combine technical learning with judgement, communication, and problem-solving.

Despite increasing attention to digital skills, competency development can remain fragmented. Some organisations concentrate on technical training, while others emphasise broad behavioural competencies without adequately

addressing the ethical and practical implications of digital tools. A more integrated approach is needed—one that treats technological capability, human judgement, professional ethics, and continuous learning as mutually reinforcing components of workforce readiness.

Research on human–AI collaboration further complicates simple narratives of technological replacement. Jarrahi (2018) argues that computational analysis and human contextual judgement can complement one another in organisational decision-making, particularly under uncertainty.

This article develops a conceptual perspective on digital transformation and workforce adaptability. It argues that professional competence should be understood as a dynamic combination of technical knowledge, cognitive capabilities, interpersonal effectiveness, ethical responsibility, and learning capacity. It also proposes that organisations must create the conditions through which these competencies can be developed and applied.

Many organisations approach digital transformation primarily as a technological or operational initiative. They acquire software, automate processes, implement data systems, and introduce artificial intelligence without necessarily redesigning competency frameworks, career-development pathways, or workplace learning practices.

This imbalance can produce a gap between technological adoption and employees' ability to use new systems effectively. Workers may possess substantial professional experience but lack the confidence or support required to transition to unfamiliar digital workflows. Conversely, employees with strong technical skills may struggle to assess the limitations of automated recommendations, communicate complex findings, or make ethically defensible decisions.

The problem is therefore not limited to a shortage of digital skills. It also concerns the capacity of professionals and organisations to renew competencies as work changes. A narrow focus on isolated technical training may provide short-term operational benefits but fail to develop the broader adaptability required for sustained transformation.

Accordingly, this article examines how professional competencies can be reconceptualised to support continuous technological and organisational change.

The central question is therefore not simply which skills employees need. It is how an organisation converts new capabilities into responsible, observable changes in professional practice, and when that conversion fails. This article develops an explanatory framework for that transition and distinguishes it from existing competency inventories.

2. Conceptual approach and analytical boundaries

This article is a theory-informed conceptual synthesis, not a systematic or scoping review. The literature was selected purposively to answer four linked questions: (1) how digital change alters work demands; (2) what adaptive competence entails; (3) which workplace conditions permit competence to be enacted; and (4) how enactment can be distinguished from sustained outcomes. Foundational accounts of adaptive performance (Pulakos et al., 2000), dynamic capabilities (Teece, 2007), organisational learning (Argyris & Schön, 1978), work design (Parker et al., 2017), digital transformation (Vial, 2019; Verhoef et al., 2021), and digital skills (van Laar et al., 2017) were selected because they explain different stages of the proposed pathway. Contrasting perspectives on human–AI collaboration and automation were considered to identify tensions rather than to imply consensus (Jarrahi, 2018; Raisch & Krakowski, 2021).

Selection boundaries were defined by conceptual relevance rather than exhaustive retrieval. Foundational research was retained irrespective of year, alongside digital-transformation and human–AI studies published mainly from 2017 to 2025. Sources were included when they defined a construct, explained a proposed relationship, supplied a competing explanation or informed measurement. Policy reports supplied contextual information only. This purposive set supports theory development but cannot establish evidence prevalence or comprehensive coverage.

The synthesis proceeded through construct definition, cross-level theoretical comparison, identification of competence-to-practice discontinuities, and formulation of conditional propositions with potential disconfirming observations. The process is interpretive rather than a systematic search, formal screening exercise or empirical test.

The synthesis was conducted through five linked analytical steps: defining constructs; comparing explanations across individual, team and organisational levels; identifying the competence-to-practice gap; specifying mechanisms and boundary conditions; and deriving propositions that can be challenged by empirical evidence. Figure 1 presents this interpretive sequence. The process was purposive and non-systematic; it does not represent database screening, a formal evidence-quality assessment or empirical validation.

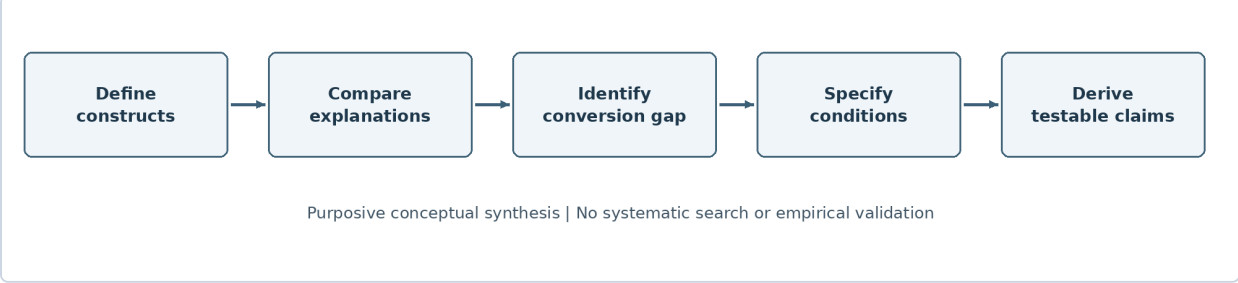


Figure 1. Conceptual synthesis and framework-development process.

Figure 1 should be read from left to right. The five boxes describe the sequence of conceptual reasoning rather than five independent datasets or a quantitative selection pipeline. The output is a set of conditional propositions, not evidence that the framework works in practice.

The synthesis proceeded through four interpretive stages: construct definition; comparison of explanations across levels; identification of the competence-to-practice gap; and formulation of conditional, falsifiable propositions. The process diagram summarises these analytical decisions rather than a PRISMA-style search or quality assessment.

2.1 Source-selection rationale and evidence boundaries

Included sources were peer-reviewed conceptual, review or empirical publications directly relevant to a framework construct, cross-level mechanism, measurement choice or credible competing explanation. Automation-reliance studies were included to challenge the assumption that greater use of digital recommendations indicates better professional judgement (Parasuraman & Riley, 1997; Lee & See, 2004). Generic digitalisation commentary without an explanatory mechanism and unverifiable claims were excluded. These decisions are an explicit rationale, not a claim that every relevant source was identified.

The synthesis is organised around explanatory roles rather than a claim of comprehensive retrieval. Pulakos et al. (2000) anchors observable adaptive performance; Teece (2007) explains organisational renewal at the firm level; Argyris and Schön (1978) addresses learning from errors; Parker et al. (2017) addresses discretion and task design; Edmondson (1999) addresses team psychological safety; and Vial (2019) and Verhoef et al. (2021) define the broader digital-transformation context. Bouwmans et al. (2024) is used as a contemporary comparator because its systematic review proposes six digital-transformation skillsets, a different objective from explaining how acquired competence becomes enacted practice.

The source-to-construct map below identifies the explanatory role of selected works; omission of alternative perspectives remains a limitation of this conceptual synthesis. Table 1a also states what each source cannot establish, preventing the framework from presenting selected literature as proof of the proposed causal pathway.

Foundational works were retained for their explanatory importance, while recent sources contextualised contemporary digital work. A future systematic review would require a separately specified search protocol and formal appraisal.

Table 1a. Source-to-construct evidence map (illustrative, purposively selected).

Perspective / source	Evidence used in the synthesis	Boundary of inference
Adaptive performance: Pulakos et al. (2000)	Observable adjustment to novel demands	Limitation: taxonomy does not establish digital transfer conditions.
Work design: Parker et al. (2017)	Discretion, task structure and resources	Limitation: broad work-design synthesis, not a test of this five-element framework.
Team learning: Edmondson (1999)	Psychological safety and learning behaviour	Limitation: team-level relationships do not automatically establish individual decision quality.
Digital skillsets: Bouwmans et al. (2024)	Contemporary competency taxonomy	Limitation: identifying skills differs from observing workplace enactment.
Digital transformation: Vial (2019); Verhoef et al. (2021)	Organisational and strategic change context	Limitation: context does not independently verify the proposed transfer mechanism.
Dynamic capabilities: Teece (2007)	Renewal and reconfiguration at organisational level	Limitation: firm-level capabilities should not be inferred directly from individual training scores.
Parasuraman & Riley (1997); Lee & See (2004)	Appropriate automation reliance and calibrated trust	Clarifies judgement and oversight; does not establish the proposed conversion pathway

3. Theoretical foundations and the conversion problem

3.1 Digital transformation and changing task demands

Digital transformation involves changes in how organisations create value, coordinate activities, and respond to their environments through digital technologies. Vial (2019) conceptualised digital transformation as a process in which digital technologies trigger disruptions that organisations must address through strategic responses and changes in value-creation processes.

This perspective indicates that technology adoption is not an isolated technical event. Introducing an intelligent decision-support system, for example, may change how professionals collect evidence, allocate responsibility, document decisions, and communicate with clients. The resulting competency requirements depend not only on the system itself but also on the way work is redesigned around it.

Verhoef et al. (2021) similarly distinguished digital transformation from narrower forms of digital change by emphasising its implications for organisational strategy, business models, structures, and processes. These changes suggest that professional development must extend beyond

training employees to use particular applications. It must prepare them to interpret and respond to continuing changes in the organisation of work.

3.2 Adaptive performance is not a synonym for digital proficiency

Workforce adaptability refers to the capacity of individuals and teams to adjust their knowledge, behaviour, and work methods in response to new tasks, technologies, circumstances, and expectations. It includes both readiness for change and the practical ability to perform effectively under changing conditions.

Pulakos et al. (2000) provided an influential framework for adaptive job performance, showing that adaptability encompasses several distinct forms of behaviour rather than a single generalised trait. These include responding to unexpected situations, learning new tasks, solving problems creatively, and adjusting interpersonal behaviour.

In a digital environment, these dimensions may appear when a professional learns a new clinical information system, evaluates the reliability of automated analysis, adapts to a revised regulatory platform, or collaborates with colleagues across geographically dispersed teams.

Adaptability should not, however, be equated with unquestioning acceptance of every technological change. Professionals must sometimes challenge poorly designed systems, identify risks, and recommend alternatives. Effective adaptability therefore involves informed adjustment, critical evaluation, and responsible resistance when technological practices conflict with professional obligations.

3.3 Organisational renewal, learning and work design

The dynamic capabilities perspective explains how organisations respond to changing environments by identifying opportunities and threats, mobilising resources, and transforming their capabilities (Teece, 2007). Applied to workforce development, this perspective suggests that organisations require mechanisms for detecting emerging competency needs, providing relevant learning opportunities, and redesigning work as technologies evolve.

A workforce may initially develop proficiency in a particular platform, but the platform can subsequently change or be replaced. Consequently, the long-term value of professional development depends not only on mastery of current tools but also on employees' capacity to learn, transfer knowledge, and respond to future requirements.

The implication is that workforce adaptability should be embedded in organisational strategy. Human resource management, technology governance, professional education, and operational planning should be coordinated rather than treated as separate functions.

Organisational learning provides another foundation for understanding workforce adaptability. Argyris and Schön (1978) distinguished between correcting errors within existing assumptions and questioning the assumptions that guide organisational practices. This distinction is particularly relevant to digital transformation.

Single-loop learning may occur when employees receive instructions for correcting an error in a digital workflow. Double-loop learning occurs when the organisation also examines whether the workflow itself, its assumptions, or its performance criteria require revision.

For example, if an automated recruitment system repeatedly produces questionable recommendations, additional user training may be insufficient. The organisation may need to reconsider its data, selection criteria, governance arrangements, and assumptions about appropriate decision-making.

Senge (1990) emphasised the importance of learning organisations that develop collective capacity to understand complex problems and improve practices. In digitally transforming workplaces, this requires opportunities for experimentation, knowledge sharing, reflection, and the dissemination of lessons across teams.

These literatures operate at different levels. Digital transformation describes changes in technologies and work arrangements; adaptive-performance research describes observable responses by individuals; dynamic capabilities concern organisational renewal; and work-design research explains whether employees can exercise discretion and obtain feedback. Linking these levels requires a conversion mechanism rather than a simple assertion that more training improves performance.

3.4 Existing explanations and the proposed addition

Table 1b. Established perspectives and the unresolved conversion problem.

Perspective	Established contribution	Unresolved transition addressed here
Adaptive performance (Pulakos et al., 2000)	Describes dimensions of adaptive behaviour	How digital training becomes enacted adaptive behaviour
Digital skills (van Laar et al., 2017)	Differentiates digital and broader transferable skills	Whether skills are applied responsibly in changing work
Dynamic capabilities (Teece, 2007)	Explains organisational sensing and renewal	How organisational investment reaches frontline practice
Work design (Parker et al., 2017)	Shows importance of autonomy and context	Which work conditions permit or block skills transfer
Digital transformation (Vial, 2019)	Connects technology with organisational change	How enacted practices and outcomes can be evaluated separately

The proposed theoretical addition is a conditional conversion account. Competence is a necessary resource for some adaptive tasks but is not sufficient for adaptive practice. Opportunities to exercise judgement, psychologically safe feedback, appropriate governance and task-relevant learning moderate the transition. The model predicts divergence between training scores and workplace outcomes when these conditions are absent. This claim is integrative and testable; none of its individual components is asserted to be new. The proposed novelty lies in separating possession of competence from situated enactment and treating organisational opportunity, judgement calibration and governance as identifiable conversion conditions. Unlike an additive skills inventory, this account permits a negative prediction: training can improve test performance without improving work outcomes when discretion, feedback or safe escalation are absent.

The framework does not claim that digital competence causes better outcomes by itself. Its distinct claim is that acquired competence must pass through an opportunity-and-judgement conversion stage before it can be observed as adaptive practice. Work-design discretion, feedback and governance are proposed as conditions of conversion; sustained quality and employee welfare are distinct downstream criteria. This separates individual learning, enacted behaviour and organisational results, which are often collapsed in training evaluation.

3.4.1 Positioning against training-transfer and implementation-climate research

A critical distinction is therefore necessary: conventional transfer accounts predict that training design and transfer climate influence whether learned skills are applied, whereas the present model proposes an additional, task-specific test of calibration under uncertain digital recommendations. If measures of appropriate reliance and escalation provide no incremental explanation of adaptive practice or sustained outcomes after accounting for established transfer factors, the proposed extension would have limited explanatory value. Conversely, a reproducible incremental association would support further investigation, not by itself demonstrate causation.

The transfer-of-training literature already establishes that trainee characteristics, training design and work-environment conditions affect the generalisation and maintenance of learned capabilities at work (Baldwin & Ford, 1988). A subsequent meta-analysis also examines predictors of transfer rather than treating training completion as sufficient evidence of workplace performance (Blume et al., 2010). Accordingly, the present framework does not claim to discover a training-to-practice gap. It extends the discussion to digitally mediated professional judgement by distinguishing competence gains, appropriateness of decisions involving algorithmic recommendations, collective correction of problematic workflows and the persistence of responsible outcomes. These distinctions are proposed as a context-specific integrative specification, not a novel general theory of transfer.

Implementation-climate research offers an additional rival explanation. Klein et al. (2001) found that organisational implementation policies and practices and a supportive climate were associated with effective technology use. The present framework therefore cannot attribute improvements to individual learning when implementation quality, leadership support or technology reliability may explain the same pattern. Its incremental value must be assessed by whether measures of judgement calibration, exception reporting and outcome sustainability explain variation beyond established transfer, implementation-climate and work-design variables.

3.5 Distinctive predictions and rival explanations

Human oversight and appropriate reliance on automation. Parasuraman and Riley (1997) distinguished automation use, misuse, disuse and abuse, while Lee and See (2004) argued that trust should be calibrated to the automation's capabilities and task conditions. These perspectives caution against equating either high acceptance rates or frequent overrides with good professional judgement. In the proposed framework, the relevant behaviour is contextually appropriate reliance: accepting well-supported recommendations, questioning uncertain outputs and escalating cases that exceed authorised discretion. This is a theoretical application of automation-reliance research, not an empirically established effect of the present framework.

The framework should be judged against explanations that already account for improved performance. A technology-affordance account predicts that improved interface design and system reliability can improve service quality without additional employee learning. A selection account predicts that motivated, experienced workers both pursue training and perform well. Work-design theory predicts that discretion and resources directly support performance. These explanations are not dismissed; each is plausible and may coexist with the proposed mechanisms (Parker et al., 2017; Vial, 2019). Table 1b summarises the established contributions of the theories and the specific conversion question this article addresses.

The conditional conversion account makes a narrower, differentiating prediction: when two teams achieve similar gains on independently assessed digital competence, the team with usable decision authority, structured feedback and clear escalation rules should demonstrate more appropriate adaptive decisions, after accounting for workload, system reliability and prior performance. It also predicts that a team may improve speed without improving decision appropriateness or employee welfare. Such a result would challenge any assumption that operational efficiency necessarily indicates sustainable adaptation. Conversely, if training-to-practice transfer is equally strong regardless of these enabling conditions, the framework's proposed moderation mechanism would be weakened.

Incremental test against conventional training-transfer accounts. The distinctive claim is not merely that supportive work environments improve transfer, which is already well established. Rather, for similarly trained employees with comparable assessed competence and general transfer support, opportunity to exercise professional judgement under uncertain digital recommendations should predict the appropriateness of actual accept, override and escalation decisions, above and beyond training quality, general supervisor support and system usability. A pre-specified interaction between competence gains and decision discretion, together with independently adjudicated decision quality, would provide a discriminating test. If general transfer climate and usability fully explain this pattern, or the interaction is negligible after adjustment, the framework adds little incremental explanatory value. This is a proposed testable distinction, not a demonstrated result.

This account is an integrative theoretical specification, not a claim that transfer, psychological safety or work design were previously undiscovered. Its contribution is to separate three potentially divergent outcomes—acquired competence, situated adaptive enactment and sustained responsible performance—and to state the conditions and observations that would distinguish their relationships. Recent digital-skills synthesis already offers a substantial taxonomy; therefore the present model does not compete by claiming to identify new skill categories (Bouwmans et al., 2024).

4. Framework: from technological pressure to sustainable practice Table 2 distinguishes the five constructs, their levels of analysis and possible evidence. Figure 2 shows the proposed relationships between them.

4.1 Five linked constructs

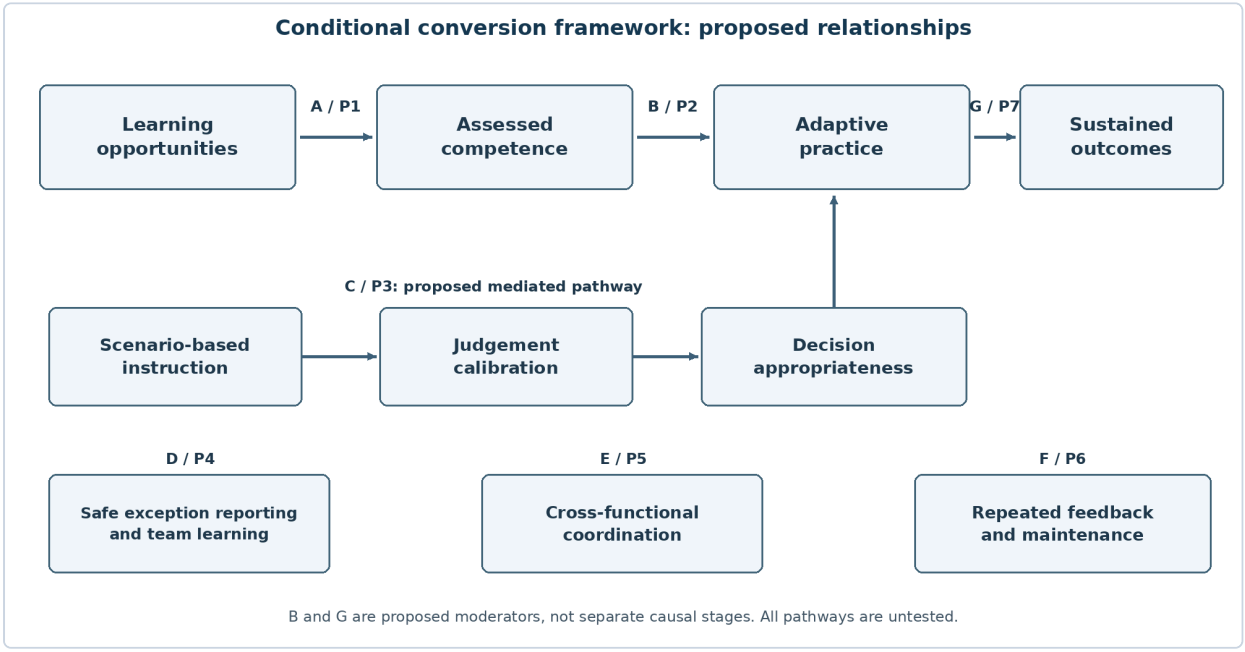


Figure 2. Conditional conversion framework for workforce adaptability.

Note. Figure 2 distinguishes the main competence-to-practice sequence from proposed moderators, mediation and team-level support processes. A–G correspond to propositions P1–P7. Solid arrows indicate proposed pathways, dashed arrows indicate proposed moderation, and the curved feedback arrow indicates an exploratory learning loop rather than an additional tested proposition. No causal relationship is established by this conceptual diagram.

Table 2. Five framework elements, levels and illustrative evidence.

Element and level	Definition	Possible evidence
1. Digital task pressures (organisation/task)	Changes in tools, responsibilities, decision rights and risks	Implementation logs, task analyses
2. Competency renewal (individual/team)	Acquisition of technical, analytical, interpersonal and ethical capability	Role-specific practical assessments
3. Enabling conditions (team/organisation)	Discretion, protected practice time, feedback, accessible learning and governance	Work-design assessment, policy and resource audits
4. Enacted adaptive practice (individual/team)	Appropriate adjustment of work and judgement under changed demands	Observed scenarios, workflow decisions, escalation records
5. Sustainable outcomes (team/organisation)	Quality, reliability, welfare and responsible performance maintained over time	Longitudinal service, error and well-being measures

Figure 2 and Table 2 should be read together. A/P1 links role-relevant learning opportunities to assessed competence. B/P2 proposes that decision discretion, appropriate practice opportunities and actionable feedback moderate the relationship between competence and enacted adaptive practice. C/P3 proposes that scenario-based instruction may improve judgement calibration, which may in turn improve the appropriateness of accept, override and escalation decisions. D/P4 links safe exception reporting to team learning and workflow revision. E/P5 links cross-functional information sharing to coordinated adaptive action. F/P6 links repeated feedback and review to the maintenance of practice. G/P7 proposes that governance and workload conditions moderate the relationship between enacted practice and sustained outcomes. These are distinct propositions and should not be interpreted as seven empirically verified effects.

Diagram-reading rule. The main sequence is learning opportunities → assessed competence → adaptive practice → sustained outcomes. B and G modify the strength or direction of specified relationships rather than forming additional stages. C is a proposed mediated pathway, while D, E and F represent complementary team-learning, coordination and maintenance pathways. The feedback loop returns outcome information to later learning and work redesign. Evidence for P3 mediation would require temporally separated measures of instruction, calibration and decisions; a single training-group difference would not suffice.

4.2 Proposed mechanisms, moderators and competing explanations

Three proposed mechanisms need to be distinguished. First, opportunity for enactment concerns whether a worker can use acquired competence in a legitimate task. Protected practice time is one possible support, not a universal requirement: routine low-risk tasks may permit supervised application during normal work, while high-risk or regulated settings may require simulations, staged authorisation or formal supervision instead. Second, judgement calibration concerns whether workers can identify when to accept, question, override or escalate digital recommendations. Feedback contributes to this conversion when it is timely, specific, credible and linked to a subsequent opportunity to revise a decision; feedback that merely reports a score or arrives too late may have little effect. Third, collective learning occurs when documented exceptions are examined and workflows are changed. Psychological safety may encourage reporting, but reporting alone does not establish better decisions (Edmondson, 1999).

The framework anticipates weaker transfer when employees lack decision authority, when systems are unreliable, when learning opportunities are unequal, or when regulatory duties prevent experimentation. Apparent gains may instead reflect better staffing, easier cases, stronger management attention, prior motivation or concurrent process redesign. Such rival explanations must be measured. A successful technology rollout without improved professional judgement would not support the full framework.

4.3 Competency domains and their boundaries

The proposed competencies are digital and information literacy; critical and ethical judgement; learning agility; communication and cross-functional collaboration; emotional regulation and resilience; and creative problem-solving. These domains are not claimed as a novel taxonomy. Their relevance depends on the professional task. For example, an employee using AI-supported case triage needs to recognise missing case information and know when to override or escalate a recommendation. A software-use quiz alone cannot demonstrate that capability. Equally, resilience must not be used to excuse unreasonable workloads or weak organisational support (van Laar et al., 2017; Pulakos et al., 2000).

Construct distinctions are essential. Digital competence is demonstrated ability to use and critically evaluate relevant tools; learning agility is the propensity and capacity to learn unfamiliar tasks across changing conditions. Workforce adaptability is the broader capacity to respond appropriately to altered demands, whereas enacted adaptive practice is an observable instance of adjusted judgement or workflow. Sustainable outcomes refer to quality, reliability, welfare and responsible use maintained across repeated observation periods. A high training score is not evidence of enacted practice, and a faster process is not necessarily a sustainable outcome.

4.4 Explanatory roles, levels and scope conditions

The model distinguishes antecedents (digital task pressures and role-relevant learning), capability (independently assessed competence), enactment (adaptive decisions and practices) and sustained outcomes (quality, responsible technology use and employee well-being). Decision authority, feedback and governance clarity are candidate moderators of competence-to-practice conversion. Judgement calibration is a candidate mediator of the effect of scenario-based instruction on decision appropriateness: the proposed indirect pathway requires evidence that instruction precedes change in calibration and that calibration precedes decision outcomes, with confounding and alternative pathways assessed. Neither a group difference nor a cross-sectional association establishes mediation. Psychological safety and implementation climate are team-level conditions, whereas competence and case decisions are measured at the individual level; aggregation requires empirical justification.

The framework is most directly applicable to discretionary, digitally mediated professional work where employees can assess, question or escalate system outputs. It is less informative for fully prescribed tasks with no legitimate decision discretion. Generalisation across healthcare, education, administration and engineering requires occupationally appropriate outcomes and evidence of comparable construct meaning. High-risk sectors may require narrower discretion, stronger independent review and stricter escalation rules; the model does not assume that more autonomy is always desirable.

5. Research propositions

The propositions have distinct explanatory functions. P1 is a foundational antecedent prediction; P2 and P7 concern moderation; P3 specifies a candidate indirect mechanism, with a separate training-comparison prediction; P4 and P5 address team learning and coordination; and P6 concerns maintenance. Future studies must distinguish mediation, moderation and direct effects through appropriate temporal measurement and analysis. None has been empirically established in this article.

P1 — Competence acquisition

Role-relevant learning opportunities will be associated with improvements in independently assessed digital and analytical competence, after accounting for baseline proficiency.

P2 — Transfer conditions

The association between independently assessed competence gains and observed adaptive practice is expected to be stronger where workers have legitimate task discretion, an appropriate opportunity to apply learning and actionable feedback. The form of practice opportunity should be proportionate to task risk: supervised routine work, simulation or protected time may be suitable in different professional contexts. Protected time is therefore a possible enabling condition, not a universal prerequisite.

P3 — Judgement calibration

P3a (intervention contrast): Compared with tool-operation training alone, scenario-based instruction addressing uncertainty, ethics and escalation is expected to improve independently assessed judgement calibration and the appropriateness of accept, override and escalation decisions when digital recommendations are unreliable. P3b (candidate mediation): Improvements in judgement calibration are hypothesised to explain part, but not necessarily all, of the association between scenario-based instruction and subsequent decision appropriateness. This indirect effect requires separate temporal measures and adjustment for plausible common causes; P3a alone does not establish P3b.

P4 — Collective learning

Teams with psychologically safe reporting and structured review of digital exceptions will be more likely to revise unsuitable workflows than teams lacking these conditions.

P5 — Collaborative coordination

Where tasks span professional boundaries, cross-functional information sharing will strengthen the relationship between individual capability and coordinated adaptive action.

P6 — Sustainable renewal

Repeated, task-relevant feedback and opportunities to apply corrections are expected to be associated with more durable competence and practice changes than isolated course completion, conditional on stable resources and work demands. This proposition concerns feedback that identifies a specific performance gap, supports correction and permits reassessment; repeated feedback without opportunity for corrective action is not assumed to improve outcomes.

P7 — Outcome alignment

Improved adaptive practices will be associated with sustained service quality and responsible technology use only where governance and workload conditions remain adequate; efficiency gains alone will not establish this outcome. Table 3 maps each research question to its associated propositions, level of analysis and principal evidence.

P1 concerns learning, P2 the transfer of learning into behaviour, P3 decision quality under uncertainty, P4 team-level correction, P5 coordination, P6 persistence and P7 sustained outcomes. These distinctions reduce conceptual overlap and allow one proposition to fail without automatically invalidating the others.

Proposition-to-question alignment. RQ1 asks whether role-relevant learning improves independently assessed competence (P1; individual level). RQ2 asks when competence is converted into appropriate adaptive decisions (P2–P3; individual and work-design levels). RQ3 asks how teams correct failures and coordinate across boundaries (P4–P5; team level). RQ4 asks whether practices persist and improve outcomes without shifting costs to workers or service users (P6–P7; team and organisational levels). These four questions replace overlapping skill-list and implementation questions; each proposition has a distinct outcome or mechanism.

Table 3. Research questions, propositions and evidence alignment.

Research question	Propositions	Level	Primary evidence
RQ1: Competence acquisition	P1	Individual	Unfamiliar-task assessment
RQ2: Competence-to-practice transfer	P2–P3	Individual/work design	Observed decisions; escalation
RQ3: Collective correction and coordination	P4–P5	Team	Exception reviews; handoffs
RQ4: Persistence and outcomes	P6–P7	Team/organisation	Repeated practice and service indicators

6. Practical application: hypothetical public-service case

Consider a fictional public-service team introducing an AI-assisted case-triage system. After introductory training, staff can operate the interface but sometimes accept recommendations when records are incomplete. The problem is not simply insufficient digital literacy: staff also face throughput targets, unclear escalation authority and little time to review exceptional cases. The organisation introduces three changes: scenario-based exercises requiring staff to justify overrides; a written escalation route; and short weekly discussions of anonymised exceptions. Supervisors also protect time for learning and monitor workload.

The framework predicts a sequence rather than automatic success. Practical assessments may first show whether staff can recognise unreliable recommendations (competence). Observations of actual cases may then show whether they challenge the system appropriately (adaptive practice). Repeated quality audits, complaints, error rates and staff well-being would indicate whether improvements persist (outcomes). If staff pass the exercises but continue to accept unsafe outputs under workload pressure, the case would support the importance of enabling conditions while challenging a training-only explanation. This example is hypothetical and supplies no empirical evidence. Table 4 identifies illustrative measures and safeguards against confusing training exposure with demonstrated competence or enacted practice.

The example illustrates competing predictions, not effectiveness. Improvements could result from software redesign, staffing or prior experience rather than learning mechanisms; future comparisons should measure these alternatives.

7. Research design and measurement

A feasible initial evaluation would follow comparable teams implementing similar digital systems. Before implementation, researchers would record baseline competence, prior technology experience, job complexity, staffing, discretion, workload and system characteristics. Teams would be assessed again after training and at three and six months. Data should combine practical tasks, independent observation of decisions, governance audits, process-quality indicators and confidential interviews. When feasible, staggered rollout or a matched comparison group could improve inference; neither design automatically removes selection bias.

Table 4. Proposed operational measures and validity safeguards.

Construct	Proposed operational measure	Validity safeguard
Competence	Standardised role-relevant tasks with novel scenarios	Separate training attendance from demonstrated skill
Enabling conditions	Protected time, autonomy, feedback, accessible support	Combine policy records and staff accounts
Adaptive practice	Blinded ratings of real or simulated decisions and escalations	Use independent raters and agreement checks
Sustainable outcomes	Service quality, error correction, workload and well-being over time	Predefine outcomes; account for case mix and staffing
Alternative explanations	Motivation, baseline proficiency, system reliability, concurrent redesign	Model or compare these influences explicitly

An assessor rubric should evaluate evidence use, appropriateness of escalation, attention to professional duties and recognition of uncertainty, without awarding points simply for using the framework's terminology. Assessors should be trained on anchor cases, independently score a sample and report agreement. Interviews can clarify why transfer succeeds or fails, but self-reports alone should not establish performance improvement. Multilevel analysis may be appropriate when staff are nested within teams; sample size and feasibility should be established before modelling.

Measurement must distinguish exposure, capability, enactment and outcomes. Learning attendance and self-confidence are weak proxies for competence; role-relevant unfamiliar tasks are preferable. Independent assessors should score decision appropriateness against pre-agreed criteria, including justified non-use or escalation of AI recommendations. Team climate surveys should be combined

with actual reporting and correction records. Service indicators require consistent definitions, risk adjustment and comparable observation windows; error rates and time savings may change when reporting practices or case complexity change. Where teams are compared, clustering, selection effects, concurrent technology changes and differential access to training should be examined. Cross-role comparisons require task-equivalent scenarios, explicit rater training, pre-specified scoring anchors and checks of inter-rater agreement. Changes in task complexity, staffing or technology reliability should be recorded so that an apparent improvement in performance is not misattributed to training.

7.1 Occupation-specific measurement and construct validity

A universal primary outcome would be inappropriate because professional decisions differ in their risks, available discretion and standards of correctness. In AI-assisted case triage, the proportion of appropriately accepted, overridden or escalated recommendations is a plausible candidate outcome. In education, a more relevant outcome might be independently assessed instructional adjustments that remain consistent with safeguarding and curriculum duties; in engineering, it may concern justified escalation of anomalous system outputs. Each study should define one primary occupation-specific outcome prospectively, supported by a content-valid rubric and independent domain experts. Cross-sector comparisons should focus on comparable latent constructs only after examining measurement invariance; raw percentages should not be pooled across occupations without justification.

7.2 Discriminating empirical tests and decision rules

For the illustrative AI-assisted case-triage setting only, the proposed primary outcome is the proportion of independently adjudicated decisions that appropriately accept, override or escalate a digital recommendation under predefined professional standards. This is not a universal outcome measure. Secondary outcomes could include error severity, service timeliness, worker well-being and recurrence of corrected errors. A prospective study could estimate a between-team difference in change from baseline to six months, while treating decision authority, feedback and implementation climate as prespecified moderators and measuring competence gains independently.

A stronger causal design would compare multiple teams before and after implementation, with matched comparison teams selected using pre-intervention workload, staffing, leadership, prior performance, case mix and technology maturity. Where feasible and ethically appropriate, a staggered rollout could create more credible temporal contrasts. Because adoption timing may reflect readiness, researchers should document allocation and test pre-intervention trends; neither matching nor difference-in-differences eliminates unmeasured confounding. Analyses should consider clustering, missingness, spillovers, changes in system quality and concurrent workflow redesign. A stepped-wedge randomised design could be considered only where allocation and service obligations permit. The empirical protocol must justify sample size and specify sensitivity analyses before data collection.

Researchers should preregister the primary outcome, case-inclusion rules, assessment rubric, clinically or operationally meaningful threshold where relevant, planned moderators and missing-data approach before observing outcomes. Two blinded assessors could independently score a sample of cases; disagreement should be resolved using predefined criteria and inter-rater agreement reported. Baseline differences in job complexity, prior experience, staffing, workload, system quality and management support must be assessed. A staggered rollout may permit a difference-in-differences analysis if parallel-trends assumptions are credible; otherwise a matched longitudinal comparison should be described as associational.

Employers should first identify how new technology changes actual tasks, decision rights and risks. Training should use realistic cases and an appropriate route into practice. Protected practice time may be useful where operational pressure otherwise prevents safe learning, but it is not necessary for every role: supervised on-the-job application or simulation may be more suitable. Managers should ensure that feedback identifies what was done well, what requires correction, who may authorise a change and when the revised practice will be checked.

Interpretation should respect levels of analysis: individual competence and decisions are nested within teams, while governance and work design may operate at team or organisational level. Statistical power, cluster count, measurement invariance across occupational groups and temporal ordering need to be established in a separate empirical protocol. No sample-size claim or numerical effect estimate is warranted in the present conceptual paper.

8. Implications for professional practice and education

Employers should map changes in task demands before purchasing training packages. Learning programmes should use realistic cases and provide supervised opportunities to practise, while managers ensure that staff have authority and time to apply what they learn. Governance should specify when algorithmic recommendations require review and how concerns can be raised without inappropriate penalty. Professional bodies and educators can combine digital skills with ethical reasoning, collaboration and the ability to recognise uncertainty. Evaluation should ask whether work has improved, not merely whether a course was completed or a platform adopted.

The framework also has a distributional implication: unequal access to learning, mentoring and decision authority can widen differences in professional opportunity. Workforce adaptability should therefore be assessed alongside fairness, workload and employee well-being, not used to transfer the costs of technological change entirely to individual workers.

Critical boundary conditions include high-risk regulated decisions, unreliable systems, limited worker autonomy and unequal access to training. The framework may be less applicable when employees cannot alter prescribed workflows or when short observation periods cannot capture long-term outcomes. There is also a tension between discretion and standardisation: more autonomy may support adaptation but can undermine consistency unless governance is clear. Likewise, more reporting may initially increase recorded errors while improving organisational learning. These possibilities prevent treating every indicator change as evidence of failure or success.

8.1 What would falsify or narrow the framework?

The conditional conversion account would be weakened if competence gains consistently predicted appropriate adaptive practice regardless of discretion, feedback or governance; if its proposed moderators added no explanatory value beyond established training-transfer and implementation-climate variables; or if improved decision appropriateness failed to predict any sustainable outcome after accounting for task risk and resource changes. Such findings would favour a simpler training-transfer, technology-affordance or implementation-quality explanation. The framework should therefore be treated as a set of competing, revisable hypotheses rather than a universal causal sequence.

9. Limitations and future research

This is a conceptual argument based on purposively selected sources. The five elements and seven propositions have not been empirically validated, and the paper does not demonstrate that the proposed relationships are universal. Conceptual boundaries may vary across occupations, especially where discretion, regulation and the consequences of error differ. The illustrative case is fictional. Future work should compare sectors, test the proposed mediators and moderators, and examine negative cases in which training improves measured competence without improving practice or outcomes. Qualitative process tracing could clarify the causal sequence before larger quantitative studies are attempted.

10. Conclusion

Digital transformation can change professional work faster than organisations renew the conditions required to perform it responsibly. This article distinguishes competency acquisition from enacted adaptation and from sustained organisational benefit. Its proposed contribution is a conditional conversion framework linking technological task pressures, competency renewal, enabling work conditions, adaptive practice and longer-term outcomes. By identifying rival explanations and falsifiable propositions, the framework offers a more precise basis for research and professional development than treating training completion or technology adoption as evidence of adaptability.

Author Contributions: Author contributions: Author confirm their actual roles in conceptualisation, literature synthesis, methodology, writing and critical revision, and approve the final manuscript.

Data Availability Statement: This conceptual and methodological article reports no newly collected or analysed participant data. No underlying individual-level dataset is associated with the manuscript.

Conflicts of Interest: Conflicts of interest: The author declare no relevant financial and non-financial interests.

Ethics Statement: This manuscript presents a conceptual framework and illustrative scenarios only. It does not involve recruitment, intervention, interviews or analysis of identifiable human participant records. Any future empirical validation involving human participants or restricted records should obtain the required ethics determination and permissions.

AI Use Disclosure: Generative AI tools assisted with language editing, proof reading and reference checking. The author are responsible for independent verification, intellectual contribution and final approval.

References

Argyris, C., & Schön, D. A. (1978). Organizational learning: A theory of action perspective. Addison-Wesley.

Baldwin, T. T., & Ford, J. K. (1988). Transfer of training: A review and directions for future research. Personnel Psychology, 41(1), 63–105. https://doi.org/10.1111/j.1744-6570.1988.tb00632.x

Blume, B. D., Ford, J. K., Baldwin, T. T., & Huang, J. L. (2010). Transfer of training: A meta-analytic review. Journal of Management, 36(4), 1065–1105. https://doi.org/10.1177/0149206309352880

Bouwmans, M., Lub, X., Orlowski, M., & Nguyen, T.-V. (2024). Developing the digital transformation skills framework: A systematic literature review approach. PLOS ONE, 19(7), e0304127. https://doi.org/10.1371/journal.pone.0304127

Edmondson, A. (1999). Psychological safety and learning behavior in work teams. Administrative Science Quarterly, 44(2), 350–383. https://doi.org/10.2307/2666999

Jarrahi, M. H. (2018). Artificial intelligence and the future of work: Human–AI symbiosis in organizational decision making. Business Horizons, 61(4), 577–586. https://doi.org/10.1016/j.bushor.2018.03.007

Klein, K. J., Conn, A. B., & Sorra, J. S. (2001). Implementing computerized technology: An organizational analysis. Journal of Applied Psychology, 86(5), 811–824. https://doi.org/10.1037/0021-9010.86.5.811

Lee, J. D., & See, K. A. (2004). Trust in automation: Designing for appropriate reliance. Human Factors, 46(1), 50–80. https://doi.org/10.1518/hfes.46.1.50_30392

Parasuraman, R., & Riley, V. (1997). Humans and automation: Use, misuse, disuse, abuse. Human Factors, 39(2), 230–253. https://doi.org/10.1518/001872097778543886

Parker, S. K., Van den Broeck, A., & Holman, D. (2017). Work design influences: A synthesis of multilevel factors that affect the design of jobs. Academy of Management Annals, 11(1), 267–308. https://doi.org/10.5465/annals.2014.0054

Pulakos, E. D., Arad, S., Donovan, M. A., & Plamondon, K. E. (2000). Adaptability in the workplace: Development of a taxonomy of adaptive performance. Journal of Applied Psychology, 85(4), 612–624. https://doi.org/10.1037/0021-9010.85.4.612

Raisch, S., & Krakowski, S. (2021). Artificial intelligence and management: The automation–augmentation paradox. Academy of Management Review, 46(1), 192–210. https://doi.org/10.5465/amr.2018.0072

Senge, P. M. (1990). The fifth discipline: The art and practice of the learning organization. Doubleday.

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. Strategic Management Journal, 28(13), 1319–1350. https://doi.org/10.1002/smj.640

van Laar, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M., & de Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. Computers in Human Behavior, 72, 577–588. https://doi.org/10.1016/j.chb.2017.03.010

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. Journal of Business Research, 122, 889–901. https://doi.org/10.1016/j.jbusres.2019.09.022

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. The Journal of Strategic Information Systems, 28(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Author declarations

Funding: No Funding

© 2026 The Author(s). Published by **International Business Strategies Pte Ltd**, Singapore. This is an open access article distributed under the terms of the **Creative Commons Attribution 4.0 International License (CC BY 4.0)**.