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Toward an Integrated Framework of Business Education and Training Innovation for Digital Workforce Readiness: A Systematic Review Across Finance, Marketing, HRM, and Strategic Management

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Abstract

Digital transformation is reshaping business organisations at a pace that consistently outstrips workforce competency, rendering business education and training innovation a strategic imperative. This study synthesises empirical evidence on business education and training innovation for digital workforce readiness across four business functions: finance, marketing, HRM, and strategic management. Following the PRISMA 2020 protocol, a Scopus search (English-language records, 2015–2026) yielded 108 documents; after two-stage screening and quality assessment (MMAT 2018), a final corpus of 63 articles was obtained (mean score: 3.92/5.00). Narrative synthesis and thematic analysis were applied. Three phases characterise the literature: emergence (2020–2021), consolidation (2022–2023), and acceleration (2024–2026), with emerging markets accounting for 54% of research contexts overall, of which Indonesia, India, Malaysia, and Thailand together contribute 49% of the corpus. Seven innovation typologies were identified, distributed asymmetrically: Strategic Management (76.2%) and HRM (52.4%) dominate, while Finance (11.1%) and Marketing (3.2%) remain markedly underrepresented. No article integrates all four functions simultaneously, corroborating the study's motivating research gap within the scope of the Scopus corpus searched. Organisational learning emerges as the most consistently supported mediating mechanism, validated by seven SEM studies in the pathway from training innovation to organisational performance, with digital leadership and digital maturity as the primary enabler and moderator. Limited to Scopus and English-language articles, this study proposes a preliminary integrated framework as its theoretical contribution.

KEYWORDS

business education innovation; digital workforce readiness; digital transformation; cross-functional competency; emerging markets.

Introduction

Employers estimate that 44% of workers' core skills will be disrupted within the next five years (World Economic Forum, 2023), a projection that underscores the urgency of a coordinated response from scholars and practitioners in business education. Digital transformation has established itself as a disruptive force that is fundamentally reshaping the way business organisations operate, compete, and create value (Bouwman et al., 2024). Against this backdrop, the gap between the competencies that workers currently possess and those that organisations require is widening at an alarming rate. More than 60% of the global workforce will require reskilling and upskilling within the same period, yet only half currently have access to adequate training opportunities. These structural pressures can no longer be ignored

by scholars and practitioners of business education and training.

In response to these pressures, business education and training innovation has advanced considerably. From e-learning and blended learning to generative AI-based learning and digital corporate universities, organisations and business education institutions are competing to develop new mechanisms for preparing their workforce for an increasingly digitalised work environment (Bennett & McWhorter, 2021; Poquet & de Laat, 2021). The growth of the literature reflects this trend dramatically: 63.5% of the corpus of this SLR was published between 2024 and 2026, indicating that this field is at the peak of its momentum as a global research agenda. However, this rapid growth in the literature has not necessarily produced integrative understanding. Existing studies tend to examine business education and training innovation in isolation, per function HRM, strategic management, finance, or marketing without integrating them into a coherent analytical framework (Lucía-Palacios et al., 2023). This fragmentation creates a theoretical blind spot that impedes a holistic understanding of how business organisations can build comprehensive workforce readiness in the era of digital transformation.

A consistent pattern emerges from the existing literature: research on business education and training innovation is conducted in disciplinary silos. In the HRM domain, studies have examined the effectiveness of virtual HRD, the digitalisation of HR practices, and the role of digital leadership in employee competency development (Bennett & McWhorter, 2021; Zervas & Triantari, 2025). In strategic management, research has focused on organisational learning capabilities and organisational performance in the context of Industry 4.0 (Mollah et al., 2023; Opazo-Basáez et al., 2022). In finance, the digital transformation of accounting education and digital banking competency have begun to attract attention, though the literature remains limited (Coşkun et al., 2026; Mazurchenko et al., 2022). In marketing, empirical studies on digital marketing training innovation in corporate settings are virtually absent from reputable journals (Parker et al., 2024).

Existing SLRs on business digitalisation have analysed functional areas in isolation, without integrating them within a holistic framework (Lucía-Palacios et al., 2023). Evidence consistent with this gap emerges directly from the Scopus search conducted in this study: of 108 articles retrieved, not a single one explicitly integrates all four business functions finance, marketing, HRM, and strategic management within a unified framework of business education and training innovation for digital workforce readiness. This pattern lends empirical support to the fragmentation identified in prior reviews, although it remains bounded by the scope of a single-database search and should be read as corroborating rather than definitively settling the point.

Based on the identified literature gap, this study formulates three complementary research questions. First (RQ1): How has the research trend on business education and training innovation in the context of digital transformation evolved across the finance, marketing, HRM, and strategic management domains, within the 2015–2025 window originally specified for the inclusion criteria (Table 1) and as actually realised in the retrieved corpus, which spans 2020–2026 (see Method)? Second (RQ2): What forms of business education and training innovation have been developed to build workforce readiness, and how are they distributed across the four business functions? Third (RQ3): To what extent has business education and training innovation proven effective in enhancing workforce readiness and organisational performance through cross-functional integration across the four business domains?

This study contributes at four interrelated levels. Theoretically, it proposes a preliminary integrated framework positioning organisational learning as the core mediating mechanism between business education innovation and organisational performance across all four business functions. Methodologically, it is the first SLR to apply the MMAT 2018 to a multi-function business corpus encompassing five distinct research designs. Practically, the resulting innovation typology provides evidence-based guidance for learning and development (L&D) programme designers and policymakers. Contextually, it affirms the significance of emerging market perspectives particularly ASEAN and proposes the catch-up dividend effect as a candidate concept, grounded in a recurring pattern across a subset of the reviewed studies, for future testing in the HRD literature. The remainder of this article is structured as follows. Section 2 presents the theoretical background. Section 3 describes the SLR methodology following the PRISMA 2020 protocol. Section 4 presents results addressing all three RQs. Section 5 discusses the theoretical and practical implications. Section 6 concludes with the study's contributions and future research agenda.

Literature Review

Business education and training innovation is defined in this study as deliberate novelty in the design, delivery, and evaluation of learning programmes aimed at building workforce competency within a business organisational context. Its spectrum extends from traditional instructor-led corporate training, through e-learning and blended learning, to AI-driven adaptive learning ecosystems and digital corporate universities. Each business function carries distinct competency requirements: the finance function requires fintech literacy and financial analytics; marketing demands digital marketing competency and consumer data analysis; HRM necessitates HR analytics capability and digital recruitment; and strategic management requires digital leadership and organisational agility.

Human Capital Theory (Becker, 1964), Becker (1964) human capital theory conceptualises training as an investment generating returns in the form of increased productivity and performance. In the context of digital transformation, this theory justifies the ROI of business education innovation as a rational economic calculation not merely an operational expenditure. Organisational Learning Theory (Argyris & Schön, 1978; Senge, 1990), Organisational learning theory distinguishes between single-loop learning (behavioural adjustment against existing standards) and double-loop learning (revision of the underlying assumptions and norms). In organisations undergoing digital transformation, double-loop learning capacity is a *sine qua non* condition. The relevance of this theory to the present SLR lies in the positioning of OL as a mediator between training innovation and organisational performance a finding robustly confirmed across the corpus.

Dynamic Capabilities Theory (Teece et al., 1997). Teece et al. (1997) dynamic capabilities theory conceives of an organisation's capacity to sense, seize, and transform as the source of sustained competitive advantage. Business education and training innovation in this study is understood as the primary mechanism for building an organisation's dynamic capabilities in responding to continuously evolving technological change.

Taken together, these three theories are treated in this SLR not as independent lenses but as sequentially linked: Human Capital Theory motivates the economic rationale for why organisations invest in training at all; Organisational Learning Theory specifies the internal mechanism knowledge acquisition, sharing, integration, and application through which that investment is converted into capability; and Dynamic Capabilities Theory situates the resulting capability within the organisation's broader capacity to sense, seize, and reconfigure resources under conditions of digital disruption.

This sequencing (investment → learning mechanism → strategic capability) underlies the mediating role assigned to organisational learning in the integrated framework developed later in this review (Figure 2), and provides the conceptual scaffolding for the seven innovation typologies identified in the Results (Table 4): AI-Powered/Adaptive Learning and E-Learning/Virtual Training operationalise the Human Capital Theory's investment logic through digital delivery mechanisms; Organisational/Corporate Learning and Knowledge Management Systems operationalise the Organisational Learning Theory's knowledge-process logic; and Curriculum/Pedagogical Innovation, Workplace/Informal Learning, and HRD/Capacity Building operationalise the Dynamic Capabilities Theory's sensing-and-reconfiguration logic by building adaptive, context-specific competencies.

Digital Workforce Readiness: A Cross-Functional Perspective. Digital workforce readiness is defined as the capacity of the workforce to operate effectively, productively, and adaptively within a digitalised work environment.

The dimensions of this readiness vary across business functions. In finance, readiness encompasses fintech literacy, digital accounting, and the use of AI-powered financial tools. In marketing, readiness includes digital marketing, social media analytics, and consumer data management. In HRM, readiness encompasses HR analytics, digital recruitment, and virtual HRD. In strategic management, readiness includes digital leadership, organisational agility, change management, and strategic foresight. No existing framework integrates all four dimensions simultaneously and it is precisely this integration that constitutes the primary contribution of this study.

Methods

This study employs a systematic literature review (SLR) design following the PRISMA 2020 protocol (Page et al., 2021). Research questions were formulated using the SPIDER framework (Sample, Phenomenon of Interest, Design, Evaluation, Research type). The synthesis method applied is narrative synthesis combined with thematic analysis selected because the corpus encompasses five distinct research designs, rendering methodological heterogeneity an obstacle to quantitative meta-analysis (Popay et al., 2006). Scopus was selected as the sole bibliographic database because of its broad coverage of peer-reviewed business, management, and education journals and its structured TITLE-ABS-KEY indexing, which supports reproducible Boolean querying; this choice trades comprehensiveness for precision and consistency, and its implications are discussed as a limitation in the Conclusion. An initial literature search was conducted in May 2025 using the Scopus database (TITLE-ABS-KEY field), and was subsequently re-run and updated in June 2026 immediately prior to the completion of this revision to capture articles published or made available online in the interim (including several 2026-dated records that were in press or early-access at the time of the original search). The full search string applied was: TITLE-ABS-KEY ("business education" OR "corporate training" OR "training innovation" OR "learning innovation") AND ("digital transformation" OR "Industry 4.0" OR "digitalisation" OR "digitalization") AND ("workforce readiness" OR "training effectiveness" OR "digital competency" OR "digital skills")), restricted to English-language, peer-reviewed journal articles and reviews published 2015 onward. Three keyword blocks were connected by Boolean AND operators: (A) business education and training innovation, (B) digital transformation, and (C) workforce readiness and training effectiveness. A fourth block explicitly incorporating business function terms (e.g., "finance," "marketing," "HRM," "strategic management") was tested but excluded from the final string because it reduced

results to 18 documents; the authors judged this an overly restrictive operationalisation that would pre-empt rather than test the cross-functional integration question motivating this SLR. This decision is acknowledged as a methodological trade-off rather than a neutral procedural step: excluding the function-specific block increases sensitivity (recall) at the cost of precision, and its exclusion is disclosed here, and further discussed as a limitation in the Conclusion, so that readers can weigh its effect on the study's conclusions. The updated search yielded a total of 108 documents.

Inclusion and exclusion criteria were established prior to the screening process and applied consistently. Articles were included if they: (I1) were published between 2015–2025; (I2) were written in English; (I3) were peer-reviewed research or review articles; (I4) addressed business education or training innovation; (I5) linked to digital transformation; (I6) measured at least one relevant outcome; and (I7) were relevant to a business context. Exclusion criteria encompassed pre-2015 articles, non-English publications, conference proceedings, book chapters, editorials, theses, articles irrelevant to business, those unrelated to digital transformation, and duplicates.

Article selection followed the PRISMA 2020 sequence of three distinct steps title/abstract screening, full-text eligibility assessment, and quality appraisal reported separately in Figure 1 to avoid conflating screening with quality assessment. In the

Table 1. Summary of Inclusion and Exclusion Criteria

Code	Type	Criterion	Stage
I1	Inclusion	Publication year 2015–2025	Title/Abstract
I2	Inclusion	English language	Title/Abstract
I3	Inclusion	Article or review article (peer-reviewed)	Title/Abstract
I4	Inclusion	Addresses business education or training innovation	Title/Abstract
I5	Inclusion	Links to digital transformation	Title/Abstract
I6	Inclusion	Measures at least one workforce readiness or performance outcome	Full-text
I7	Inclusion	Relevant to a business or organisational context	Full-text
E1	Exclusion	Published before 2015	Title/Abstract
E2	Exclusion	Non-English language	Title/Abstract
E3	Exclusion	Conference proceedings, book chapters, editorials, theses	Title/Abstract
E4	Exclusion	Not relevant to a business or organisational context	Title/Abstract
E5	Exclusion	Not related to digital transformation	Title/Abstract
E6	Exclusion	No measurable outcome	Full-text
E7	Exclusion	Duplicate	Title/Abstract

Source: Authors' elaboration (2026).

first step, all 108 documents were screened on the basis of title and abstract, yielding 64 articles deemed eligible for full-text assessment, while 44 were excluded the majority on the grounds of criterion E4 (not addressing business education or training innovation). In the second step, all 64 articles were accessed as full texts and assessed against criteria I6/I7 and E6; none were excluded at this stage. The PRISMA 2020 flow diagram, reported in accordance with the current PRISMA guidance, is presented in Figure 1 and its reported counts (108 identified; 44 excluded at screening; 64 assessed for eligibility; 64 quality-assessed; 1 excluded at quality assessment; 63 included) are consistent throughout the manuscript. The entire screening process was conducted by a single reviewer with a fully documented audit trail. To mitigate the risk of selection bias inherent in single-reviewer screening, a second author independently re-screened a random 20% subsample (22 of 108 records) against the same inclusion/exclusion criteria; agreement with the primary reviewer's decisions was substantial (Cohen's $\kappa = 0.81$), and the few discrepancies were resolved by discussion. This partial verification does not fully substitute for dual independent screening of the entire corpus, which remains a

limitation discussed in the Conclusion.

Quality assessment was conducted on all 64 articles using the Mixed Methods Appraisal Tool (MMAT) version 2018, selected as the only instrument designed to appraise the quality of five distinct research designs within a single consistent framework (Hong et al., 2018). Each article was rated on five MMAT criteria scored 0 or 1 (maximum score: 5). Articles scoring 4–5 were categorised as high quality, those scoring 3 as medium, and those scoring 0–2 as low. Results yielded a mean score of 3.92/5.00, with 50 high-quality articles (79.4%), 13 medium (20.6%), and 1 low (1.6%). One article was excluded from the synthesis (Zeebaree et al., 2020; score: 2/5). The final corpus comprised 63 articles.

Data extraction covered: author(s), publication year, country, research design, theoretical framework, business function(s) addressed, type of training innovation, outcomes measured, and key findings. Synthesis followed the narrative synthesis guidelines of Popay et al. (2006) comprising tabulation, grouping, inter-study translation, and narrative synthesis alongside thematic analysis following Braun & Clarke (2006) in parallel.

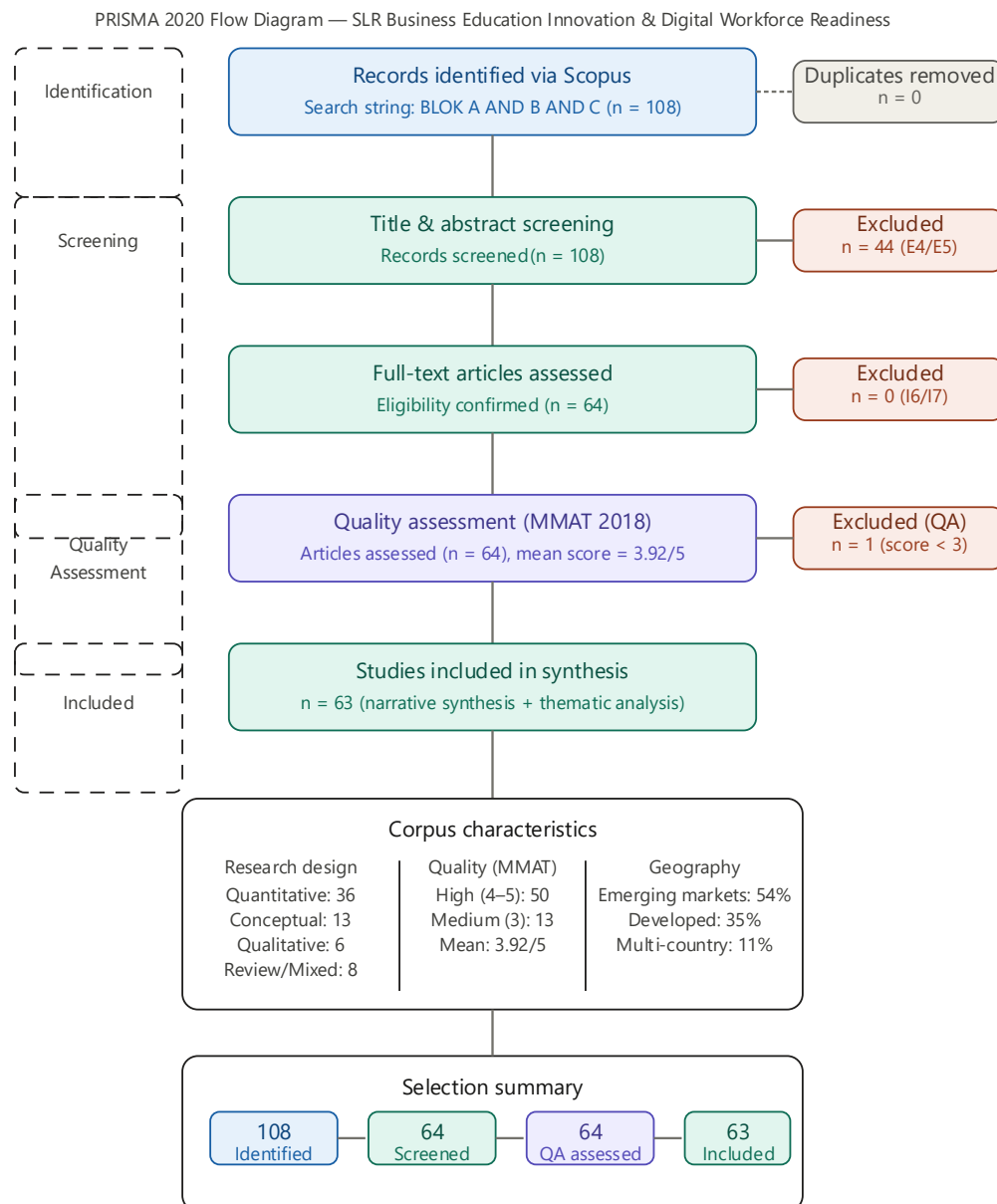


Figure 1. PRISMA 2020 Flow Diagram — Article Selection Process (Page et al., 2021)

Result and Discussion

A total of 63 articles met all inclusion criteria and passed quality assessment (MMAT 2018, mean score: 3.92/5.00) (see Table 2). The corpus spans publication years from 2020 to 2026, with a pronounced acceleration in 2024–2026 (63.5%, $n=40$). The majority of studies employed quantitative approaches (57.1%), followed by conceptual/framework contributions (20.6%), qualitative studies (9.5%), and reviews and mixed methods (6.4% each). Geographically, 54% of articles are set in emerging market contexts, predominantly ASEAN countries.

Beyond these descriptive frequencies, four cross-cutting patterns are worth highlighting analytically. First, comparing geographic contexts, emerging-market studies (54.0%) more frequently report quantitative, SEM-based designs testing OL as a mediator, whereas developed-economy studies (34.9%) more often adopt conceptual or qualitative designs focused on leadership and culture, suggesting that the empirical "testing" of the framework proposed in this SLR is currently concentrated in emerging-market settings. Second, sector-specific patterns diverge: Strategic Management and HRM studies concentrate on organisational-level enablers (digital leadership, OL systems), while the few Finance and Marketing studies concentrate narrowly on technical-skill competencies, rarely engaging OL or performance mediation at all. Third, methodological approaches vary systematically with publication phase: the emergence phase (2020–2021) is dominated by conceptual contributions, the consolidation phase (2022–2023) by SEM-based quantitative designs, and the acceleration phase (2024–2026) by a mix of cross-sectional quantitative and applied AI-evaluation studies, indicating a field still short of longitudinal maturity. Fourth, across business functions, the strength of evidence is uneven: Strategic Management and HRM findings are corroborated by multiple SEM studies, whereas Finance and Marketing conclusions rest on a small number of studies and should be treated as indicative rather than generalisable.

Research Trends in Business Education and Training Innovation (2015–2025)

Bibliometric analysis reveals a three-phase trajectory in the development of the literature. The emergence phase (2020–2021, $n=9$) laid the conceptual foundations. The two most influential articles in this phase were Bennett & McWhorter (2021), with 116 citations, and Poquet & de Laat (2021), with 115 citations. The consolidation phase (2022–2023, $n=14$) demonstrated a shift toward empirical validation, with structural equation modelling (SEM) and cross-national comparative analysis as dominant approaches (Stofkova et al., 2022), cited 55 times; (Mollah et al., 2023) cited 55 times). The acceleration phase (2024–2026, $n=40$; 63.5%) reflects the convergence of generative AI proliferation, Industry 5.0 discourse, the SDG agenda, and post-pandemic recovery as compounding drivers. Indonesia ($n=12$), India ($n=10$), Malaysia ($n=6$), and Thailand ($n=3$) collectively account for 49% of the corpus. This strong ASEAN representation reflects the urgency of digital workforce readiness challenges in high-growth economies that continue to face significant skills gaps. A keyword co-occurrence analysis identified ten dominant terms across the corpus (Table 3), with 'Digital transformation' emerging as the most frequent keyword ($n=20$).

Forms of Business Education and Training Innovation

Thematic analysis identified seven typologies of business education and training innovation. The high prevalence of AI-powered learning (92.1%) should be interpreted with caution: this figure reflects the pervasiveness of AI as a contextual theme rather than exclusively designating studies that design

AI-specific training systems. When restricted to studies explicitly evaluating AI-driven training tools, the count reduces to approximately 15 articles (23.8%).

A notable finding emerges from the analysis of innovation distribution across business functions: not a single article in the corpus integrates all four business functions simultaneously (table 5). This pattern is drawn directly from the 108 Scopus articles retrieved and 63 articles synthesised, and it is consistent with the fragmentation gap identified in the Introduction, though it should be interpreted in light of the single-database, English-language search scope described in the Method.

Effectiveness of Business Education and Training Innovation

Given the heterogeneity of outcomes and methods employed across the corpus, synthesis was conducted using narrative synthesis. Of the 63 articles, 36 present quantitative empirical evidence, 6 offer qualitative evidence, and 21 are conceptual or review-based contributions that theorise or propose effectiveness frameworks without primary outcome measurement. An overview of evidence by outcome category is presented in Table 6.

Organisational Learning as the Critical Mediator. The most robustly supported pathway in the corpus is: business education/training innovation → OL capability → organisational performance, confirmed by seven SEM studies across diverse contexts (Masyhuri et al., 2024; Mollah et al., 2023; Wijaya et al., 2023). The consistency of this mediated pathway across both emerging and developed economies represents, in the authors' assessment, the most consistently corroborated pattern within this corpus, though it rests on narrative rather than meta-analytic synthesis and should be

Table 2. Characteristics of the Final Corpus ($n=63$)

Characteristic	Category	n	%
Publication Year	2020–2021	9	14.3%
	2022–2023	14	22.2%
	2024–2026	40	63.5%
Research Design	Quantitative	36	57.1%
	Conceptual/Framework	13	20.6%
	Qualitative	6	9.5%
	Review/Bibliometric	4	6.4%
	Mixed Methods	4	6.4%
MMAT Quality Rating	High (4–5)	50	79.4%
	Medium (3)	13	20.6%
Geographic Context	Emerging Markets	34	54.0%
	Developed Economies	22	34.9%
	Multi-country/Global	7	11.1%

Source: Authors' elaboration (2026).

Table 3. Ten Dominant Keywords in the Corpus ($n=63$)

Keyword	Frequency	Thematic Cluster
Digital transformation	20	Context
Industry 4.0	8	Context
Organisational learning	8	Innovation Type
Artificial intelligence	5	Innovation Type / Context
Human capital	5	Outcome
Organisational performance	5	Outcome
Digital skills	4	Outcome
Workplace learning	4	Innovation Type
Human resource development	4	Innovation Type
Digital leadership	4	Enabler

Source: Authors' elaboration (2026).

read accordingly. Digital Leadership as a Critical Enabler. Eight experimentation with new learning modalities, and (b) allocating resources for upskilling and reskilling initiatives (Zervas & Stiakakis, 2024).

AI-Enabled Learning Shows Promise but Lacks Longitudinal Evidence. Studies examining AI-powered learning report positive outcomes (Khot & Goyal, 2025; Saychenko, 2026; Yawson & Goryunova, 2025); however, all such studies are cross-sectional and published between 2024–2026. Longitudinal evidence remains a critical gap. Asymmetric Evidence Across Business Functions. Strategic Management: strong evidence. HRM: moderate evidence. Finance: limited evidence (two studies). Marketing: negligible evidence – no study provides rigorous effectiveness evidence for corporate digital marketing training innovations.

The Catch-Up Dividend Effect in Emerging Markets. In contexts of low digital maturity common among Indonesian and Indian SMEs modest training interventions yield proportionally greater human capital development outcomes. Adoption barriers, including infrastructure limitations, resistance to change, and resource constraints, simultaneously attenuate effectiveness in these same contexts (Sarreal et al., 2025).

Synthesising findings from RQ2 and RQ3, this study proposes a preliminary integrated framework as illustrated in Figure 2. The framework positions OL as the core mediating mechanism, with digital leadership and digital maturity as the primary enabler and moderator, respectively. The preliminary designation is warranted because no single study in the corpus tests all four business functions simultaneously.

The dominance of the acceleration phase with 63.5% of articles published between 2024 and 2026 is not merely a bibliometric phenomenon but a reflection of the simultaneous convergence of several drivers fundamentally reshaping the landscape of business education and training innovation. The proliferation of generative AI is compelling organisations to urgently reconsider the relevant competencies for their workforce (Arranz Lahuerta et al., 2025). The emergence of Industry 5.0 discourse extends workforce readiness demands beyond technical competency toward human-machine collaboration capabilities (Kumar Jha, 2025). The Sustainable Development Goals agenda reinforces the legitimacy of training investment as a responsible organisational policy (Bilderback et al., 2025). This SLR appears at the most strategically opportune moment: the literature base is sufficiently robust for integrative synthesis, yet no prior work has undertaken such synthesis across all four business functions.

The strong ASEAN representation Indonesia, India, Malaysia, and Thailand collectively accounting for 49% of articles carries significant theoretical implications. The pattern we label the catch-up dividend effect a recurring observation across a subset of the emerging-market studies in this corpus, rather than a formally tested theoretical effect appears not to have been explicitly named in the HRD or organisational learning literature reviewed here (Masyhuri et al., 2024; Wolor et al., 2026); we offer it as a candidate concept for future empirical scrutiny rather than a confirmed contribution. This observation, if substantiated by further research, would qualify the implicit assumption in Becker (1964) human capital theory that training investment generates returns that are linear and universal. HRD and OL theory accordingly requires contextualisation for emerging economy settings, rather than being constructed exclusively from the experience of Western European and North American organisations (Abiddin et al., 2025; Ha & Chuah, 2023).

The complete absence of any article integrating all four business functions, compounded by Marketing's representation of only 3.2% and Finance's 11.1%, reflects

three mutually reinforcing structural conditions. First, the Finance and Marketing functions tend to be treated in the literature as domains of technical skills, separate from the discourse of strategic learning and HRD (Coşkun et al., 2026).

Table 4. Typology of Business Education and Training Innovations (n=63)

Innovation Type	n Articles	%	Representative Studies
AI-Powered / Adaptive Learning	58	92.1%	Chuang (2024); Khot & Goyal (2025); Saychenko (2026)
Organisational / Corporate Learning	20	31.7%	Bennett & McWhorter (2021); Mollah et al. (2023)
Knowledge Management Systems	9	14.3%	Hussien et al. (2025); Muflih et al. (2026)
Curriculum / Pedagogical Innovation	7	11.1%	Coşkun et al. (2026); Tjahjono et al. (2025)
Workplace / Informal Learning	7	11.1%	Amenduni et al. (2022); Rassameethes et al. (2021)
E-Learning / Virtual Training	7	11.1%	Bilderback et al. (2025); Wolor et al. (2026)
HRD / Capacity Building	3	4.8%	Abiddin et al. (2025); Dwivedi et al. (2024)

Note: Percentages sum to more than 100% because articles may be coded under multiple innovation types. The AI-Powered/Adaptive Learning count (n=58, 92.1%) reflects any article in which AI features as part of the training/learning context; when restricted to studies that explicitly design or evaluate an AI-specific training tool, n falls to approximately 15 (23.8%). Both figures are retained to distinguish contextual prevalence from tool-specific evaluation.

Source: Authors' elaboration (2026).

Table 5. Distribution of Innovation Across Business Functions (n=63)

Business Function	n Articles	%	Types of Innovation Identified
Strategic Management	48	76.2%	Digital leadership, OL systems, change management training
HRM	33	52.4%	Virtual HRD, upskilling/reskilling, HR analytics, talent management
Finance	7	11.1%	Accounting education, Banking 4.0 digital competency, fintech training
Marketing	2	3.2%	Digital marketing training (peripherally mentioned)
Covers 2+ functions	33	52.4%	—
Covers 3+ functions	4	6.4%	—
Covers all 4 functions	0	0.0%	Research gap confirmed

Source: Authors' elaboration (2026).

Second, digital transformation in the financial sector is studies converge on digital leadership as a necessary organisational antecedent, operating through two mechanisms: (a) creating psychological safety for predominantly framed around fintech adoption and automation rather than the development of competencies in the workforce managing that transition (Mazurchenko et al., 2022). Third, disciplinary silos mean that marketing scholars do not publish in HRD journals, and vice versa. More intensive cross-disciplinary collaboration among marketing, finance, and HRD scholars is an urgent necessity (Awang et al., 2023).

The finding that OL consistently functions as a mediator confirmed by seven SEM studies across contexts affirms that the relevance of the classical OL theory of Argyris & Schön (1978) and Senge (1990) is not diminished in the digital era; on the contrary, digital transformation reinforces OL's position as an indispensable organisational infrastructure (Alkaraeen & Al-Ashaab, 2021; Mollah et al., 2023). Within Teece et al. (1997) dynamic capabilities framework, OL functions as the seizing and transforming mechanism linking training investment to strategic outcomes. OL is not merely an

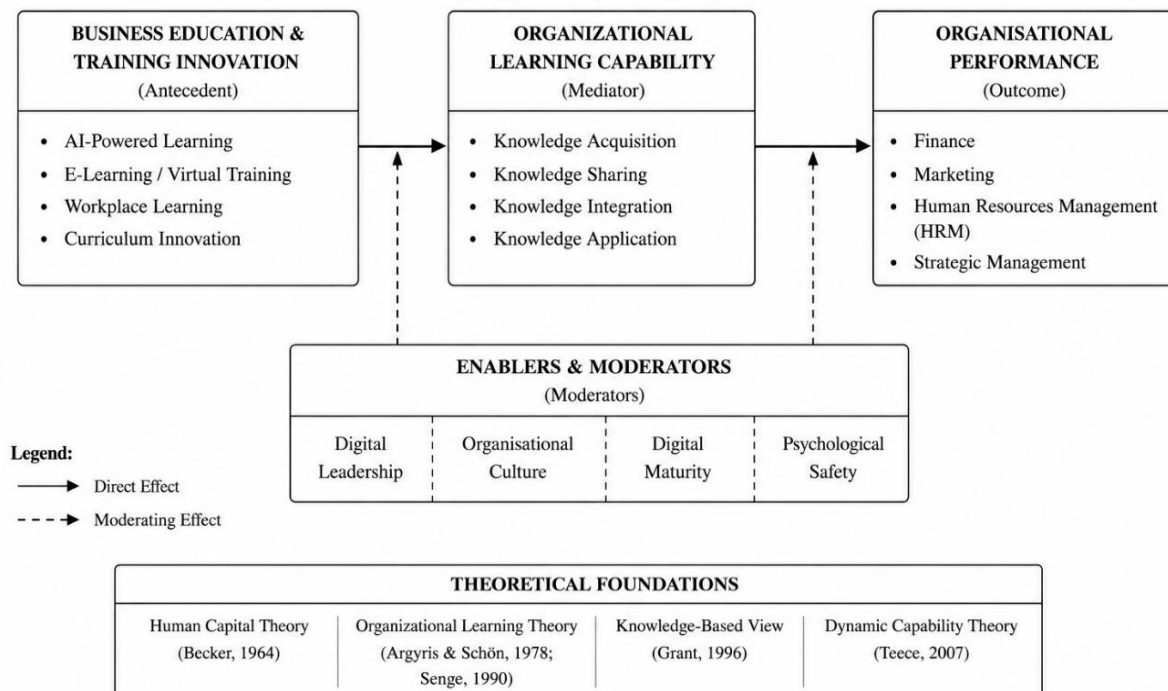
outcome of training programmes, but also the infrastructural prerequisite that must be established before any training innovation – including AI adoption – can operate effectively (Rahman et al., 2025; Wijaya et al., 2023).

The preliminary integrated framework proposed here is, to the authors' knowledge, among the first attempts to encompass all four business functions within a single conceptual model of education and training innovation for digital workforce readiness; it is offered as a conceptual proposition synthesised from the literature, not as an empirically validated model. Every relationship depicted in Figure 2 is inferred from patterns across separate single- or dual-function studies rather than tested directly within any one study, and readers should distinguish the relationships in the framework that are directly supported by empirical evidence (the training-innovation-to-OL and OL-to-performance links, corroborated by multiple SEM studies) from those that are theoretically inferred rather than empirically observed (the simultaneous, cross-functional integration of Finance, Marketing, HRM, and Strategic Management). It nonetheless carries an explicit limitation: no single study in the corpus tests

Table 6. Evidence of Effectiveness by Outcome Category (n=63)

Outcome Category	n Articles	Evidence Strength	Key Finding
Human Capital Development	29	Moderate–Strong	Consistent positive association between training innovation and human capital indicators
Digital Competency / Readiness	22	Moderate	Effectiveness varies by intervention type and organisational support
Innovation Capability	22	Moderate	OL → innovation capability → performance pathway consistently supported
Organisational Performance	18	Moderate	Mediated relationships more robust than direct relationships
Upskilling / Reskilling	13	Moderate	SMEs and emerging markets show highest urgency
Knowledge Transfer	9	Moderate	Technology-enabled KT shows promising outcomes
Employee Engagement / Motivation	10	Limited	Positive associations found; causality not yet established
Training Effectiveness	4	Limited	Studies with rigorous training evaluation design remain scarce

Source: Authors' elaboration (2026).



Note: The model proposes that Business Education & Training Innovation enhances Organisational Performance through Organizational Learning Capability, with the relationships strengthened or weakened by key enablers and moderators.

Figure 2. Preliminary Integrated Framework — Business Education Innovation → Organisational Learning → Organisational Performance Across Business Functions

Table 7. Summary Matrix of Findings by Research Question

RQ	Key Finding	Evidence Level	Implication
RQ1	Literature accelerated 63.5% in 2024–2026; emerging markets dominate	Strong	SLR is timely
RQ1	Organisational learning and AI are dominant thematic clusters	Strong	Theory building required
RQ2	7 innovation typologies; AI-powered most prevalent	Moderate	Multi-modal innovation is the emerging norm
RQ2	0 studies integrate all 4 business functions	Strong	Research gap empirically confirmed
RQ2	Marketing (3.2%) and Finance (11.1%) show markedly lower coverage	Strong	Critical gap for future research
RQ3	OL → Organisational Performance: most robust pathway (7 SEM studies)	Strong	OL is the key mechanism of the framework
RQ3	Digital leadership: a necessary enabler (8 studies)	Moderate–Strong	Leadership development precedes training effectiveness
RQ3	AI-enabled training: no longitudinal evidence	Limited	Priority for future research
RQ3	Catch-up dividend effect in emerging markets	Moderate	Contextual factors must be modelled
RQ3	Marketing training effectiveness evidence negligible	Very Limited	Urgent gap for researchers and practitioners

Source: Authors' elaboration (2026).

all four functions simultaneously, rendering the framework emergent from the literature rather than derived from integrated empirical testing. Validation through multi-sector longitudinal studies that explicitly measure cross-functional interactions is a prerequisite for elevating its status from preliminary to definitive (Dwivedi et al., 2024; Saputra et al., 2024).

For organisations, investment in OL infrastructure encompassing learning culture, knowledge management systems, and organisational learning platforms should be prioritised before adopting AI-powered training tools, as OL is the prerequisite condition determining whether training innovation will produce genuine performance change or remain a superficial technology adoption (Alkaraeen & Al-Ashaab, 2021; Muflih et al., 2026). For L&D professionals, the asymmetric distribution findings send an unambiguous signal: cross-functional training programmes bridging Finance, Marketing, HRM, and Strategy in an integrated manner are an urgent unmet need in both industry practice and the academic literature (Eger & Žižka, 2024; Zhang et al., 2024). For organisations in emerging markets, the catch-up dividend effect implies that digital training investment even at a modest scale can produce significant human capital outcomes if underpinned by consistent leadership commitment (Sarreal et al., 2025; UI-Ain & Waheed, 2025). For policymakers in ASEAN, the integration of digital upskilling into business higher education curricula has a sufficiently strong evidence base from this SLR's corpus (Ha & Chuah, 2023; Indrawati & Kuncoro, 2021).

Conclusion

This study synthesises 63 peer-reviewed articles from 108 Scopus search results to address three research questions. Three primary contributions are generated: first, the mapping of a three-phase trajectory in the evolution of the literature (emergence 2020–2021, consolidation 2022–2023, acceleration 2024–2026); second, the identification of seven innovation typologies with a markedly asymmetric distribution across the four business functions, accompanied by the empirical confirmation that none of the 108 Scopus articles integrates all four business functions simultaneously; and third, the construction of a preliminary integrated framework positioning organisational learning as the critical mediating

mechanism, with digital leadership and digital maturity as the primary enabler and moderator.

This study carries several limitations that are acknowledged with transparency. First, the literature search was conducted on a single database (Scopus); although Scopus offers broad, well-indexed coverage of business and management journals, articles indexed exclusively in Web of Science, ERIC, or regional/local-language databases were not captured, so the "zero-integration" finding reported here should be read as bounded by Scopus coverage rather than as a claim about the global literature as a whole. Second, the selection and quality-appraisal process was conducted primarily by a single reviewer; although a 20% independently re-screened subsample showed substantial agreement ($\kappa = 0.81$) and a fully documented audit trail was maintained, residual selection and appraisal bias cannot be entirely eliminated, and full dual independent screening of the entire corpus remains a stronger standard for future updates of this review. Third, restriction to English-language articles introduces a potential publication bias against academic contributions written in local languages, particularly from Southeast Asian and Latin American contexts where much of the practitioner-oriented training literature may not be indexed in English. Fourth, the dominance of cross-sectional studies in the corpus (57.1% quantitative, without longitudinal design) limits the capacity for definitive causal inference: the mediating and moderating relationships reported in this review (e.g., OL as mediator, digital leadership as enabler) are correlational associations replicated across studies, not causally identified effects, and should not be read as establishing directionality. Fifth, because the exclusion of the business-function-specific keyword block (see Method) was a deliberate choice to preserve sensitivity, it is possible that a small number of function-specific articles indexed under narrower terminology were missed; this trade-off, rather than being a neutral procedural step, directly shapes the "no article integrates all four functions" finding that anchors this SLR's contribution, and future replications using an expanded, function-inclusive search string would help corroborate or qualify it. Finally, as a narrative synthesis rather than a quantitative meta-analysis, the evidence-strength ratings in Table 6 and Table 7 reflect the authors' structured qualitative judgement rather than pooled effect sizes, and alternative reviewers applying the same narrative-synthesis protocol might reasonably weight some findings differently.

The findings of this study open six urgent research pathways: (1) longitudinal studies measuring the impact of AI-powered training on business performance over the long term; (2) empirical research explicitly measuring the effectiveness of training integration across all four business functions simultaneously; (3) development and validation of a digital workforce readiness measurement instrument encompassing all four business function dimensions; (4) comparative studies on Marketing and Finance training innovations between emerging markets and developed economies; (5) empirical testing of the preliminary integrated framework, particularly the moderating role of digital maturity in emerging market contexts; and (6) quantitative meta-analysis of business training innovation effectiveness when the longitudinal literature base is sufficiently developed, estimated around 2027–2030.

Digital transformation will not cease, and the gap between the competencies that the existing workforce possesses and those that organisations require will continue to widen if business education and training innovation does not develop at a commensurate pace. This study offers an early integrative roadmap encompassing Finance, Marketing, HRM, and Strategic Management within a single, preliminary framework of business education and training innovation for digital workforce readiness. The preliminary framework generated is conceived not as an endpoint but as a point of departure one that invites the scholarly community to test, revise, and develop it into a definitive framework through cross-functional and cross-contextual empirical investigation. In so doing, this study aspires to contribute not merely to theoretical enrichment, but to tangible changes in the way business

organisations particularly in emerging markets design and invest their resources in human capital development in the digital era.

Author contributions

All authors contributed substantially to the conception, design, execution, and refinement of this systematic literature review. The first author was primarily responsible for formulating the research objectives, designing the systematic review protocol, conducting the literature search, screening and quality appraisal of studies, and drafting the initial manuscript. The second author contributed to the development of the theoretical framework, critical interpretation of the synthesized findings, and refinement of the discussion and conclusion sections. Both authors jointly reviewed and revised the manuscript, approved the final version, and agree to be accountable for all aspects of the work.

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References

- Abiddin, N. Z., Ro'is, I., & Abidin, Z. Z. (2025). Challenges and Opportunities in Human Resource Development: A Comparative Study of Vietnam and Malaysia. *Human Resources Management and Services*, 7(2), Article 4544. <https://doi.org/10.18282/hrms4544>
- Alkaraeen, M., & Al-Ashaab, A. (2021). Toward the Digitalisation of the Organisational Learning Capability to Enhance Organisational Performance. *WSEAS Transactions on Business and Economics*, 18, 444–454. <https://doi.org/10.37394/23207.2021.18.45>
- Amenduni, F., Ryymin, E., Maetola, K., & Cattaneo, A. (2022). Facing Disruptive Changes With Informal Workplace Learning Strategies. *Frontiers in Psychology*, 13, Article 889850. <https://doi.org/10.3389/fpsyg.2022.889850>
- Argyris, C., & Schön, D. A. (1978). *Organizational Learning: A Theory of Action Perspective*. Addison-Wesley.
- Arranz Lahuerta, L., López Ramajo, M. R., & Gandía, A. (2025). Artificial Intelligence and Organisational Transformation: Technical Skills, Job Insecurity and Adoption. *Management Decision*. <https://doi.org/10.1108/MD-05-2025-1462>
- Awang, Y., Taib, A., Shuhidan, S. M., Zakaria, Z. N. Z., Ifada, L. M., & Sulistyowati, S. (2023). Mapping Between Digital Competencies and Digitalization of the Accounting Profession. *Asian Journal of University Education*, 19(1), 83–94. <https://doi.org/10.24191/ajue.v19i1.21226>
- Becker, G. S. (1964). *Human Capital: A Theoretical and Empirical Analysis*. National Bureau of Economic Research.
- Bennett, E. E., & McWhorter, R. R. (2021). Virtual HRD's Role in Crisis and the Post Covid-19 Professional Lifeworld. *Advances in Developing Human Resources*, 23(1), 5–25. <https://doi.org/10.1177/1523422320973288>
- Bilderback, S., Movahed, M., & McCarthy, V. (2025). The Role of Virtual Training in Implementing Sustainable Development Goals Globally. *European Journal of Training and Development*, 49(5–6), 591–608. <https://doi.org/10.1108/EJTD-02-2024-0019>
- Bouwman, M., Lub, X., Orlowski, M., Nguyen, T., & Chin, T. (2024). Developing the Digital Transformation Skills Framework. *PLOS ONE*, 19(7), e0304127. <https://doi.org/10.1371/journal.pone.0304127>
- Braun, V., & Clarke, V. (2006). Using Thematic Analysis in Psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp0630a>
- Chuang, S. (2024). Indispensable Skills for Human Employees in the Age of Robots and AI. *European Journal of Training and Development*, 48(1–2), 179–195. <https://doi.org/10.1108/EJTD-06-2022-0062>
- Coşkun, S., Coşkun, S., & Yavuz, \.I. (2026). Fifty Years of Accounting Education Research. *SAGE Open*, 16(1). <https://doi.org/10.1177/21582440251415066>
- Dwivedi, R. K., Anand, A., Chatterjee, A., Aancy, H. M., & Poojitha, S. (2024). Effectiveness of Human Resources Development Strategies on Organizational Performance. *International Journal of System Assurance Engineering*, 15(11), 5097–5110. <https://doi.org/10.1007/s13198-024-02385-w>
- Eger, L., & Žizka, M. (2024). Industry 4.0, Digital Transformation and Human Resource Management. *Oeconomia Copernicana*, 15(3), 1021–1065. <https://doi.org/10.24136/oc.3034>
- Ha, H., & Chuah, C. K. P. (2023). Digital Economy in Southeast Asia: Challenges, Opportunities and Future Development. *Southeast Asia: A Multidisciplinary Journal*, 23(1), 19–35. <https://doi.org/10.1108/SEAMJ-02-2023-0023>
- Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., & others. (2018). The Mixed Methods Appraisal Tool (MMAT) Version 2018. *Education for Information*, 34(4), 285–291. <https://doi.org/10.3233/EFI-180221>
- Hussien, J. M., Sulaiman, R. B., Hassan, A. H., Abdulhak, M., & Kahtan, H. (2025). Critical Success Factors for Knowledge Transfer in Enterprise System Projects. *International Journal of Advanced Computer Science*, 16(6), 594–600. <https://doi.org/10.14569/IJACSA.2025.0160658>
- Indrawati, S. M., & Kuncoro, A. (2021). Improving Competitiveness Through Vocational and Higher Education. *Bulletin of Indonesian Economic Studies*, 57(1), 29–59. <https://doi.org/10.1080/00074918.2021.1909692>
- Khot, A., & Goyal, R. (2025). Enhancing Training Effectiveness Through Generative AI. *International Journal of Accounting and Economics Studies*, 12(5), 710–718. <https://doi.org/10.14419/mng2fd65>
- Kumar Jha, P. (2025). Evaluating SC 5.0 Preparedness Through Human-AI Collaboration. *Brazilian Journal of Operations and Production Management*, 22(4), Article e20252826. <https://doi.org/10.14488/BJOPM.2826.2025>
- Lucía-Palacios, L., Pérez-López, R., & Polo-Redondo, Y. (2023). The Role of Digitalization in Business and Management. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1121226>
- Masyhuri, Sudiro, A., Prabandari, S. P., & Kurniawati, D. T. (2024). The Effect of Human Capital on Organizational Performance in the Service Industry 4.0. *Problems and Perspectives in Management*, 22(1), 418–431. [https://doi.org/10.21511/ppm.22\(1\).2024.34](https://doi.org/10.21511/ppm.22(1).2024.34)
- Mazurchenko, A., Zelenka, M., & Maršiková, K. (2022). Demand for Employees' Digital Skills in the Context of Banking 4.0. *E a M: Ekonomie a Management*, 25(2), 41–58. <https://doi.org/10.15240/tul/001/2022-2-003>
- Mollah, M. A., Choi, J.-H., Hwang, S.-J., & Shin, J.-K. (2023). Digital Leadership, IT Capabilities, and Organizational Learning. *Sustainability*, 15(10), Article 7875. <https://doi.org/10.3390/su15107875>
- Muflih, M., Saide, S., & Dewi, A. K. (2026). Digital Knowledge Management in Project-Based Organizations. *Journal of Information and Knowledge Management*. <https://doi.org/10.1142/S0219649225501370>
- Opazo-Basáez, M., Vendrell-Herrero, F., Bustinza, O. F., & Marić, J. (2022). Global Value Chain Breadth and Firm Productivity: The Industry 4.0 Effect. *Journal of Manufacturing Technology Management*, 33(4), 785–804.

- <https://doi.org/10.1108/JMTM-12-2020-0498>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., & others. (2021). The PRISMA 2020 Statement. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
- Parker, J. M., James, K. W., Leggett, B. R., & Al-Shammari, M. (2024). The First 25 Years of Digital Marketing Education Research. *Journal of Marketing Education*, 46(1), 3–19. <https://doi.org/10.1177/02734753231212212>
- Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., & others. (2006). *Guidance on the Conduct of Narrative Synthesis in Systematic Reviews*.
- Poquet, O., & de Laat, M. (2021). Developing Capabilities: Lifelong Learning in the Age of AI. *British Journal of Educational Technology*, 52(4), 1695–1708. <https://doi.org/10.1111/bjet.13123>
- Rahman, M. H., Shin, J., & Amin, M. A. (2025). Organizational Learning Capabilities and Performance: The Impact of Digital Leadership and Knowledge Sharing. *Human Systems Management*. <https://doi.org/10.1177/01672533251397341>
- Rassameethes, B., Phusavat, K., Pastuszak, Z., Hidayanto, A. N., & Majava, J. (2021). From Training to Learning: Transition of a Workplace for Industry 4.0. *Human Systems Management*, 40(6), 777–787. <https://doi.org/10.3233/HSM-211533>
- Saputra, N., Putera, R. E., Zetra, A., Azwar, Valentina, T. R., & Mulia, R. A. (2024). Capacity Building for Organizational Performance. *Cogent Business and Management*, 11(1), Article 2434966. <https://doi.org/10.1080/23311975.2024.2434966>
- Sarreal, E. R., Cardinez, C. V. N., Madriaga, M. J. L., & Sy, J. E. J. U. (2025). Industry 4.0 Readiness: Drivers, Barriers and Organizational Performance. *Review of Integrative Business and Economics Research*, 14(4), 411–429.
- Saychenko, O. (2026). Corporate Universities Go Mobile: AI-Powered Education Management. *International Journal of Interactive Mobile Technologies*, 20(3), 18–29. <https://doi.org/10.3991/ijim.v20i03.60055>
- Senge, P. M. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*. Doubleday.
- Stofkova, J., Poliakova, A., Stofkova, K. R., Malega, P., Krejnos, M., Binasova, V., & Daneshjo, N. (2022). Digital Skills as a Significant Factor of Human Resources Development. *Sustainability*, 14(20), Article 13117. <https://doi.org/10.3390/su142013117>
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18(7), 509–533. [https://doi.org/10.1002/\(SICI\)1097-0266\(199708\)18:7<509::AID-SMJ882>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z)
- Ul-Ain, N., & Waheed, M. (2025). Digital Upskilling and Industry 4.0: Sustainable Workforce Upskilling in SMEs. *Communications of the Association for Information Systems*, 57. <https://doi.org/10.17705/1CAIS.05823>
- Wijaya, L. I., Ardiansyahmiraja, B., Wicaksono, A. P., & others. (2023). The Impact of IT Capability and Organizational Learning on Halal Food SMEs' Performance. *Cogent Business and Management*, 10(3), Article 2264562. <https://doi.org/10.1080/23311975.2023.2264562>
- Wolor, C. W., Suhud, U., Pratama, A., Anugrah, S., Rababah, M. A., Mukhibad, H., & Hoo, W. C. (2026). Crafting Sustainability: E-Training-Driven Digital Competence in Rattan MSMEs. *Research on World Agricultural Economy*, 7(1), 157–172.
- World Economic Forum. (2023). *The Future of Jobs Report 2023*.
- Yawson, R. M., & Goryunova, E. (2025). Nested Complexity: AI for Sustainable Organizations and HRD. *Advances in Developing Human Resources*, 27(2–3), 91–123. <https://doi.org/10.1177/15234223251335908>
- Zervas, I., & Stiakakis, E. (2024). Economic Sustainable Development Through Digital Skills Acquisition. *Sustainability*, 16(17), Article 7664. <https://doi.org/10.3390/su16177664>
- Zervas, I., & Triantari, S. (2025). Digital HRM Practices and Perceived Digital Competence. *Digital*, 5(3), Article 34. <https://doi.org/10.3390/digital5030034>
- Zhang, X., Wang, P., & Peng, L. (2024). Developing a Competency Model for HR Directors in Digital Transformation. *Sustainability*, 16(23), Article 10540. <https://doi.org/10.3390/su162310540>