6th CoMBInES

Volume 6 No 1 (2026)

Accepted : July 11th, 2026
Published : September 30th, 2026
DOI : 10.37253/combines.v6i1.12783

Conference on Management, Business, Innovation, Education and Social Science
https://journal.uib.ac.id/index.php/combines

NAVIGATING THE HUMAN-CENTRIC TRANSITION: A SYSTEMATIC REVIEW OF AI-DIGITAL LITERACY AND INDUSTRY 5.0 CAREER-READINESS

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Abstract

As the world stands at the onset of fast-paced technological era, the global economy is not merely evolving, it is struggling with a shift that is as much psychological as it is industrial. The move from the cold, rigid automation of Industry 4.0 toward the human-centric paradigm of Industry 5.0 has fractured the traditional 'terms of engagement' for the modern workforce. IR5.0 marks a vital shift from automation to human-machine collaboration like human creativity, resilience and sustainability, on the other hand IR4.0 focused mainly on AI and automation (Nahavandi, 2019; Ivanov, 2023). The 21st century is marked towards sustainable shift towards modernization in the human life. Current modern world demands graduates equipped with technical skills like AI, robotics and IoT. Further, AI-Digital literacy plays key role in teaching and learning in upgrading knowledge via different learning channels. For the reason Educational Revolutions and industrial resolutions taken places according to the needs of society and the world. The world is progressing at an incredible speed due to swift advancement of modern technologies especially in ICT. Since the end of eighteenth century, successive industrial revolutions have fundamentally transformed economic and social systems. At present, the fourth industrial revolution is underway and can be characterized by deep digitalization, the automation of organizational processes, the implementation of advanced information systems, data analytics, and artificial intelligence. On the horizon, a new paradigm Industry 5.0 (IR5.0)

is emerging, emphasizing human centered technological integration and cooperation between humans and intelligent machines.

The Industrial Revolution (IR) comprises a prolonged development of societal and economic revolution driven by technological and industrial advancement. From rural, craft-based civilizations to contemporary structures powered by Artificial Intelligence (AI), each industrial revolution has delivered notable social developments so far raised concerns about upcoming implications. Human interactions with technology started with early innovations such as fire and primitive tools. Over times, technology has evolved through several key phases, namely from pre-industrial revolution to the different eras of the industrial revolution. These eras of industrial revolution have brought about important changes and influences in how we live and work. They are crucial for improving human quality of life. The journey of Pre-Industrial Era began before 1760 (Ajani, 2024). It was characterized by simple and manual labor with tools like the loom and basic farming equipment.

Consequently, the fast AI and digital expansion explaining the inclusive transformation from IR4.0 to IR5.0 that is reframing career-oriented perspectives, learning methods, and core competencies required for future job readiness. As industries move toward hybrid skills merging technical and soft aptitudes therefore tertiary education systems are under enormous pressure to equip graduates with communicatively and digitally proficient. However, learners in vocational, higher and tertiary education face structural, pedagogical, and socio-economic challenges that hinder their academic performance and career readiness, particularly in high-tech IR 5.0-driven sectors. Although the substantial impact of AI and Digital literacy, there is a major gap still exists between learning aftermaths and workforce demands (Wang et al., 2023). Various organizations persist to give emphasis to traditional teaching methods that focusing on theoretical understanding instead of practical and technical applications.

Different institutions have continued to focus on traditional methods of teachings which are mainly focusing theoretical understanding rather than practical AI-driven applications in the academia. As a result, learners often lack job ready skills needed in current AI-Digital workplace settings. Therefore, academia today continuously compete through innovation in order to gain and sustain future competitive advantages of learners in evolving IR5.0 career-readiness environment. Thus, there is a need for a more comprehensive framework that integrates AI-digital literacy into IR5.0 career readiness paradigm.

RESEARCH OBJECTIVES

RO1: To systematically review and synthesize existing literature on AI-digital literacy competencies and their role in supporting career readiness within the context of Industry 5.0.
RO2: To identify key research gaps, emerging trends, and human-centric skill requirements that influence the integration of AI-digital literacy into future workforce and career development frameworks.

METHODOLOGY

A systematic literature review method has been adopted for this study, based on selected peer-reviewed studies from past decade, however, only one study from 2012 was included to provide essential foundational insight into the theoretical development of the topic. Related research were recognized using Google scholar, WoS, Scopus databases where keyword mentioned AI literacy, digital literacy, career readiness and industry 5.0. Therefore,

the selected studies were analyzed to identify common patterns in career readiness, IR 5.0, AI literacy, and digital literacy.

KEY FINDINGS AND DISCUSSION

The Shift toward Industry 5.0 and Human-Centricity

The literature consistently identifies a fundamental shift from the technology-driven focus of Industry 4.0 to the human-centric approach of Industry 5.0. Nahavandi (2019) and Ivanov (2023) narrated the importance of resilience and collaboration in IR5.0 career-readiness, while there is a lack of empirical evidence and clear association to real-time workforce aspects. The findings of the study propose that although the development of a theoretical foundation, the interpretation of high-level notions into real-world professional practice remains inefficiently understood.

The Evolution of AI-Digital Literacies

Common views about digital literacy are becoming nonoperational in modern technological era. Ng (2012) has no longer meaningfully represent the current modern trends and uses of AI and digital competences. However, contemporary studies emphasis on AI and digital literacies, even if recent studies focus on AI literacy, as these skills are often studied independently rather than in combination. Moreover, a persistent gap remains in linking digital and AI literacies to employability and career readiness, thereby limiting their practical relevance to graduate employability and career readiness.

Soft Skills and Career Readiness Disconnects

Discussions on employability often overlook how technology interacts with personal attributes. While Clarke (2018) examines career identity and Succi & Canovi (2020) emphasize adaptability, both give limited attention to digital and AI integration. This separation of soft and technical skills is problematic, as Industry 5.0 increasingly demands human–machine collaboration rather than treating them as distinct domains.

In addition, the literature reviewed highlights a clear and evolving trajectory in the fields of AI literacy, digital literacy, and IR 5.0, while simultaneously revealing several critical gaps. Recent studies (2023–2026) emphasize AI literacy, responsible adoption, and labor market transformation; however, they consistently demonstrate limited empirical validation and weak connections to real-world employability outcomes. In particular, contemporary research tends to examine AI competencies, risk perception, and educational integration in isolation, thereby overlooking their combined impact on career readiness. Similarly, studies on IR 5.0 primarily focus on technological advancements, resilience, and human-centric systems, yet they offer insufficient linkage to educational practices and skill development. Earlier research on AI literacy and education (2020–2022) further reflects a lack of practical application and workforce alignment, while foundational studies on employability and digital literacy provide important theoretical insights but fail to incorporate AI-driven transformations. Collectively, these findings indicate a persistent gap in integrating AI-Digital literacy, employability skills, and IR5.0 within a unified framework. Therefore, there is a strong need for holistic, empirically grounded models that connect educational practices with evolving labor market demands, ensuring that learners are better prepared for dynamic and technology-driven professional environments. Furthermore, the following literature review analysis table presents a detailed overview of the reviewed studies.

Table 1 Literature Review Analysis

	Author(s)	Year	Focus Area	Primary Variables	Key Research Gap
1.	Yu, S., Carroll, F., & Bentley, B. L.	2026	AI literacy education and responsible adoption	AI literacy education, risk perception, responsible AI adoption	Gap in understanding how learners balance AI adoption with ethical risk perception in higher education
2.	Biagini, G.	2025	AI literacy in education systems	AI literacy, education systems, ethical AI use	Limited empirical evidence on how AI literacy translates into real-world employability skills across disciplines
3.	Chigbu, B. I. et al.	2025	Industry 5.0 and future of work integration	Industry 5.0, Education 5.0, work readiness, sustainability	Lack of integrated frameworks linking Industry 5.0 competencies with curriculum-level employability development
4.	Hong, L.	2025	Vocational education and AI competency development	AI literacy competency, vocational education, skill development	Insufficient validation of competency-based AI literacy models across different education levels and contexts
5.	Cheng, S., Cao, R., & Md Rashid, S.	2025	AI-driven labour market transformation	Employability skills, AI-driven labour market, job quality	Limited understanding of how AI transformation reshapes quality of employment in emerging economies
6.	Almatrafi et al.	2024	AI Literacy	AI competencies	Limited empirical validation
7.	Zhang et al.	2024	AI Literacy	Concept inventory	Needs real-world testing
8.	Hong & Kim	2024	AIoT Literacy	AI integration skills	Limited employability focus
9.	Ajani, O. A.	2024	Digital Transformation in Higher Education	Technological set-up, pedagogical approaches, student engagement	Lack of empirical studies centering specifically on African perspectives and experiences within the global discourse of digital transformation.
10.	Ivanov	2023	Industry 5.0 Framework	Resilience	Weak education linkage
11.	Wang et al.	2023	AI Literacy Measurement	AI competency	Limited validation
12.	Casal-Otero et al.	2023	AI Literacy Review	AI frameworks	Lack of global context
13.	Chiu et al.	2023	Student AI Literacy	Knowledge & attitudes	Weak employability link
14.	Mhlanga	2023	AI & Skills	Digital readiness	No higher education focus
15.	Ng et al.	2023	AI in Education Review	Teaching & learning	Limited career-readiness link
16.	Su & Yang	2023	AI Literacy	Early education	No tertiary focus
17.	Maddikunta et al.	2022	Industry 5.0 Tech	AI & IoT	No education linkage
18.	Leng et al.	2022	Industry 5.0	Smart systems	Human skills underexplored
19.	Ng et al.	2021	AI Literacy	Cognitive & ethical skills	Limited real-world testing
20.	Zhai et al.	2021	AI Education	Curriculum design	Weak workforce connection

21.	Long & Magerko	2020	AI Literacy	AI knowledge	Not linked to careers
22.	Succi & Canovi	2020	Soft Skills	Adaptability	No AI integration
23.	Nahavandi	2019	Industry 5.0	Human-centricity	Limited empirical validation
24.	Zawacki-Richter et al.	2019	AI in Education	Teaching & learning	No employability focus
25.	Clarke	2018	Employability	Career identity	No digital/AI link
26.	Ng	2012	Digital Literacy	Digital skills	No AI integration

IMPLICATIONS

The study highlighted that there is need of systematic approach in integration of IR 5.0, AI literacy, digital literacy and career-readiness. In this perspective, AI and digital literacy should be integrated across academic curricula, institutions should adopt integrative and practical learning approaches, and practical learning enhances skill development for future careers. Furthermore, policymakers should prioritize AI-digital integration in education and continuous learning initiatives are essential for future readiness.

CONCLUSION

The study concludes that the term IR 5.0 has restructured career- readiness concept in modern era where human and technology collaboratively work. In this dynamic digital environment, AI and Digital literacy plays an active role in connecting the gap between the career-readiness and education, empowering graduates to cope with complex and vigorous professional settings. Therefore, future research should prioritize the development of empirical models and integrated frameworks to better explain and strengthen the relationships between IR 5.0, AI-Digital literacies and career-readiness.

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Keywords:
Industry 5.0; AI-literacy; Digital Literacy; Career-readiness