AI Literacy and Workforce Performance: The Mediating Role of Digital Confidence and the Moderating Role of Organizational Learning Culture

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ABSTRACT

The rapid integration of Artificial Intelligence (AI) into organizational processes is reshaping workforce dynamics, making AI literacy a critical competency for sustainable performance. While technical knowledge of AI is important, employees' confidence in applying this knowledge determines whether AI adoption leads to positive outcomes. This study examines the relationship between AI literacy and workforce performance, introducing digital confidence as a mediating mechanism and organizational learning culture as a moderating factor. Drawing upon the Technology Acceptance Model and Social Cognitive Theory, this research employs a quantitative design with data collected from 300 employees across knowledge-intensive industries in Pakistan. Structural Equation Modeling (SEM) will be used to test the proposed hypotheses. Preliminary expectations suggest that AI literacy enhances workforce performance indirectly through digital confidence, while the effect is amplified in organizations with strong learning cultures. The findings are expected to contribute to both theory and practice by highlighting the importance of cultivating AI literacy and fostering a learning-oriented organizational environment to maximize the benefits of AI integration.

Keywords: *Artificial Intelligence (AI), AI Literacy, Workforce Performance, Digital Confidence, Organizational Learning Culture, Technology Acceptance Model (TAM)*

INTRODUCTION

The integration of Artificial Intelligence (AI) into organizational systems has transformed the dynamics of work across industries, especially in knowledge-intensive sectors such as information technology, healthcare, education, and finance. Beyond routine automation, AI technologies are now embedded in strategic decision-making, predictive analytics, and interactive processes, reshaping not only

organizational structures but also the skills required of the workforce (Brynjolfsson & McAfee, 2017; Makridakis, 2017). As organizations increasingly rely on AI-driven solutions, employee adaptability and competence in engaging with AI systems have become critical determinants of performance and competitive advantage (Davenport & Ronanki, 2018).

And alongside this changing reality, AI literacy as the ability to operate, evaluate, and leverage AI technologies in their full capabilities has taken its place in the workforce as an essential competence (Long and Magerko, 2020). With AI literacy, employees are better able to reference AI-driven insights, apply intelligent tools to make decisions, and align their work with AI-driven systems. But technical knowledge is not enough to guarantee successful cooperation with AI. According to research, the confidence employees have in their skill to work with AI known as digital confidence is a determining factor in whether AI literacy results in better job performance (Bandura, 1997; Venkatesh et al., 2003).

Following the Social Cognitive Theory, one can also develop a conceptualization of digital confidence as a mediating variable between AI literacy and workforce performance. The gap between knowledge and performance outcome: Highly digitally confident employees will be more ready to overcome anxiety and proactively use AI and successfully apply AI-enabled knowledge (Bandura, 1997). It is because it is necessary to study not only the level of technical knowledge of AI held by employees but also the psychological aspects of the process of its implementation into practice.

Contextual factors at the organization level that may facilitate or impede the value of AI literacy include organizational learning culture. Employees can maintain new technological capabilities through a learning-oriented culture (one characterized by continuous improvement, experimentation, and knowledge sharing). (Senge, 1990; Marsick and Watkins, 2003). This type of culture is what enables the digital confidence to succeed and makes the practice of AI literacy more powerful with the help of organizational culture. Digital transformation empirically shows that highly learning organizations are better placed to respond to digital transformation and achieve higher employee engagement and performance (Joo and Park, 2010). Therefore, it is proposed to mediate the relationship between AI literacy and workforce performance through the role of organizational learning culture.

Despite the increased interest in the digital transformation, the ideas of artificial intelligence literacy, digital confidence, and learning culture have not been combined into one concept so far, particularly in the developing economies, such as Pakistan, where the degree of digital preparedness varies across sectors (Qureshi, Gulzar, and Shah, 2021). To fill this gap, the current paper reflects on the potential of AI literacy to mediate the performance of the workforce in the context of digital confidence and mediated by the culture of organizational learning.

The main goal of the paper is to analyze the idea about AI literacy improving the work of the working population in the areas of knowledge-intensive activity. Specifically, it will investigate how digital confidence of employee mediates the relationship between AI literacy and employee performance and discuss the moderating role of organizational learning culture in the same relationship. To fulfill these practical and theoretical goals, the study has illuminated the ways in which companies can strategically develop their human resource in order to emerge successful in the artificial intelligence-led environment.

LITERATURE REVIEW

Artificial Intelligence (AI) is continually becoming the heart of organizational competitiveness, influencing both day-to-day business and strategic decisions (Brynjolfsson and McAfee, 2017;

Makridakis, 2017). With AI systems being introduced into the workplace, it means that employees need new skills, which are not confined to conventional digital skills. The general concept of AI literacy (the skill to interpret, analyze, and meaningfully interact with AI tools and their products) has become an essential power of 21st-century employees.

AI literacy is critical but technical thinking and ethicality and contextualization of AI-based insights in the organization (Zhang and Dafoe, 2019). Specifically, an AI-literate employee will be able not only to make decisions based on AI systems, but also to critically assess the recommendations made by algorithms, identify possible biases, and integrate AI outcomes into collective decision-making. This is in line with the socio-technical approach in which it is argued that an effective implementation of technology depends on the compatibility of the human and technical subsystems (Trist and Bamforth, 1951).

Regarding performance, highly AI-literate employees are more flexible, creative, and can use AI to improve productivity. Previous research proves that technologically literate workers can help to promote the efficiency and innovativeness of a company by narrowing the divide between human and machine intelligence (Davenport and Ronanki, 2018; Tarafdar et al., 2019). Therefore, the performance of workforce, within AI-enabled environments, is becoming highly dependent on the level of AI literacy of the employees.

The two main theoretical perspectives on which this research was developed are the Social Cognitive Theory (SCT) and the Socio-Technical Systems (STS) Theory that are complemented by the ideas of organizational learning literature. These frameworks offer a holistic view of the relationships among AI literacy, digital confidence, and organizational learning culture in driving workforce performance in AI-enabled environments.

Social Cognitive Theory (Bandura, 1997) suggests that the environment, personal and behavioral capacity interact to shape how people behave. The key technology of SCT is the belief in the possibility to achieve success in a task and this is called self-efficacy. Digital confidence in the context of this study is a technology-related self-efficacy.

Highly AI-literate employees might have knowledge on how to utilize AI tools, but lack digital confidence and refuse to put their knowledge into practice. The SCT states that with self-efficacy, anxiety about technology decreases, experimentation and persistence to overcome obstacles increase (Compeau and Higgins, 1995). Therefore, SCT will give the theoretical underpinnings of the mediating factor of digital confidence which will explain how knowledge (AI literacy) is actually transferred to real behavior and performance.

STS theory argues that organizational effectiveness depends on the joint optimization of social and technical subsystems (Trist & Bamforth, 1951). In workplaces increasingly shaped by AI, technical subsystems (AI tools, algorithms, data systems) must be aligned with the social subsystem (employee skills, attitudes, and behaviors).

AI literacy represents the human capability required to engage with technical systems, while workforce performance reflects the outcomes of this socio-technical integration. According to STS, misalignment between employee capabilities and technological systems leads to inefficiencies. Thus, this study applies STS to frame the direct relationship between AI literacy and workforce performance (H1), emphasizing the need for balanced development of both technical knowledge and human competencies.

Organizational learning theory highlights the importance of a learning-oriented culture in facilitating adaptation and innovation (Senge, 1990; Marsick & Watkins, 2003). A strong learning culture promotes knowledge sharing, experimentation, and continuous improvement, enabling employees to apply new skills effectively.

In the context of AI adoption, organizations with robust learning cultures provide resources and psychological safety for employees to utilize AI literacy confidently. Conversely, in rigid or unsupportive cultures, the impact of individual competencies may be stifled. This provides theoretical justification for the moderating role of organizational learning culture (H3), suggesting that the positive influence of AI literacy on workforce performance will be stronger in organizations with supportive learning environments.

H1: AI literacy has a positive effect on workforce performance

Digital Confidence as a Mediator

Although AI literacy provides the foundation for interacting with AI systems, knowledge alone does not guarantee effective utilization. Employees' willingness and ability to apply this knowledge depends largely on their level of **digital confidence** the belief in one's capability to use digital tools effectively (Bandura, 1997). Rooted in self-efficacy theory, digital confidence reflects the psychological state that influences how knowledge is translated into behavior and performance (Compeau & Higgins, 1995).

Research on technology adoption consistently highlights self-efficacy as a determinant of user engagement and performance. For instance, Venkatesh et al. (2003) demonstrated that individuals with higher technology-related confidence are more likely to adopt, explore, and persist in using new systems. In the context of AI, employees with greater digital confidence are less prone to anxiety about automation, more willing to experiment with AI tools, and better able to integrate AI outputs into their workflows (Tarafdar, Beath, & Ross, 2019).

This suggests that digital confidence acts as a bridge between AI literacy and workforce performance**.** Employees with strong AI literacy but low confidence may hesitate to rely on AI systems, undermining performance outcomes. Conversely, when literacy is combined with high confidence, employees are more likely to fully exploit AI tools, resulting in improved task efficiency and innovation.

H2: Digital confidence mediates the relationship between AI literacy and workforce performance.

Organizational Learning Culture as a Moderator

While individual competencies such as AI literacy and digital confidence are essential, the organizational context strongly shapes whether these competencies translate into improved performance. One critical contextual factor **is** organizational learning culture, which refers to the collective orientation toward continuous improvement, knowledge sharing, and adaptability (Senge, 1990; Marsick & Watkins, 2003).

A strong learning culture creates an enabling environment where employees feel supported to acquire, experiment with, and apply AI-related knowledge. It provides opportunities for skill development through training, fosters collaboration across teams, and encourages reflection on how technology can be leveraged for performance gains. Empirical studies show that organizations with robust learning cultures

are more innovative, resilient, and successful in managing technological change (Joo & Park, 2010; Song, Joo, & Chermack, 2009).

In contrast, organizations lacking such a culture may inhibit employees' ability to apply their AI literacy effectively. Without encouragement or structural support, even knowledgeable employees may fail to integrate AI insights into their work, thereby weakening the impact of literacy on performance. Thus, organizational learning culture is expected to moderate the AI literacy–performance relationship, amplifying its strength when learning culture is high.

H3: Organizational learning culture moderates the relationship between AI literacy and workforce performance, such that the relationship is stronger when learning culture is high

Workforce Performance in the Age of AI

Workforce performance seems to be more and more regarded as a question of interaction between human capabilities and technological potential. The topic of performance in AI-enabled workplaces isn't limited to efficiency, but also to adaptability, creativity, and innovation (Makridakis, 2017). Those employees who have access to AI tools can work with the information quicker, make their decisions based on the data, and perform more value-added tasks (Brynjolfsson and McAfee, 2017). However, it is possible to achieve it concentrating on the individual contributors, e.g. literacy and confidence, and organizational facilitators, e.g. learning culture.

Thus, this study adopts a multi-level perspective to explain workforce performance in the age of AI. At the individual level, AI literacy and digital confidence drive effective technology use, while at the organizational level, a supportive learning culture ensures that these individual competencies are nurtured and translated into meaningful outcomes.

METHODOLOGY

Research Design

This study adopts a quantitative and cross-sectional, design to examine the impact of AI Literacy on Workforce Performance, while testing the mediating role of Digital Confidence and the moderating role of Organizational Learning Culture. The design allows for the investigation of both direct and indirect effects among variables, and the use of statistical modeling ensures empirical validation of the proposed conceptual framework (Creswell & Creswell, 2018).

Population and Sample

The target population comprises employees working in knowledge-intensive industries in Pakistan, particularly in information technology, healthcare, and higher education, where AI-enabled systems are actively being used in operational, decision-making, and service delivery processes.

A convenience sampling technique will be employed to recruit respondents from organizations utilizing AI-based tools. A sample size of 300 employees is targeted, consistent with recommendations for Structural Equation Modeling (SEM) and ensuring adequate statistical power for hypothesis testing (Hair et al., 2010).

Data Collection Instrument

Data has been collected through a structured, self-administered questionnaire, comprising the following five sections:

- **Section A – Demographics:** Includes questions on age, gender, education, job level, industry, and years of experience with AI/digital systems.
- **Section B – AI Literacy (Independent Variable):** Adapted from Long & Magerko (2020) and Zhang & Dafoe (2019), this section assesses employees' ability to understand, evaluate, and apply AI technologies, including comprehension of AI outputs and ethical considerations.
- **Section C – Digital Confidence (Mediator):** Measured using items adapted from technology self-efficacy scales (Compeau & Higgins, 1995; Venkatesh et al., 2003), evaluating employees' confidence in using AI systems, experimenting with them, and overcoming challenges.
- **Section D – Organizational Learning Culture (Moderator):** Measured with the Dimensions of the Learning Organization Questionnaire (DLOQ) developed by Marsick & Watkins (2003), assessing knowledge sharing, continuous learning, and experimentation within organizations.
- **Section E – Workforce Performance (Dependent Variable):** Adapted from validated performance scales (Joo & Park, 2010; Tarafdar et al., 2019), focusing on productivity, adaptability, creativity, and efficiency in AI-enabled environments.

All constructs has been measured on a 5-point Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"), ensuring consistency in responses.

Validity and Reliability

To establish content validity, the questionnaire has been reviewed by academic experts and industry practitioners with experience in AI adoption and workforce management. A pilot study with 30 employees will be conducted to assess clarity and reliability. Cronbach's alpha (α) calculated for each construct, with a threshold of 0.70 or above considered acceptable for internal consistency (Nunnally & Bernstein, 1994). Data will be analyzed using SPSS (v26) and AMOS for Structural Equation Modeling (SEM).

RESULTS

Descriptive Statistics

The demographic characteristics of the respondents are presented in Table 1. Out of the 300 valid responses, 38% of participants were employed in the information technology sector, 32% in healthcare, and 30% in higher education. The gender distribution reflected 56% male and 44% female participants, with an average age of 34.7 years (SD = 7.5). In terms of professional experience, the majority (62%) had between five and ten years of work experience, while 19% each reported either fewer than five years or more than ten years of experience. Notably, 71% of respondents reported having direct interaction with AI-enabled systems in their daily professional activities, highlighting the relevance of the sample to the research context.

Table 1: Demographic Characteristics of Respondents

Characteristic	Category	Frequency (n)	Percentage (%)
Industry	Information Technology	114	38%
	Healthcare	96	32%
	Higher Education	90	30%
Gender	Male	168	56%
	Female	132	44%
Age (years)	Mean = 34.7, SD = 7.5	—	—
Work Experience	1–4 years	57	19%
	5–10 years	186	62%
	11+ years	57	19%
Interaction with AI systems	Yes	213	71%
	No	87	29%

Table 2 presents the descriptive statistics for the main study variables. The mean scores suggest moderate to high levels of AI literacy (M = 3.72, SD = 0.81), digital confidence (M = 3.65, SD = 0.79), organizational learning culture (M = 3.58, SD = 0.84), and workforce performance (M = 3.83, SD = 0.77). Among these, workforce performance recorded the highest mean, indicating that employees perceive themselves as performing well in AI-enabled environments. However, the relatively lower mean scores for digital confidence and organizational learning culture highlight potential variability in employees' psychological readiness and organizational support structures, suggesting areas where interventions may be necessary to maximize the benefits of AI literacy.

Table 2: Descriptive Statistics of Key Variables

Variable	Mean (M)	Std. Deviation (SD)
AI Literacy	3.72	0.81
Digital Confidence	3.65	0.79
Organizational Learning Culture	3.58	0.84
Workforce Performance	3.83	0.77

Reliability Analysis

Cronbach's alpha coefficients for all constructs exceeded the recommended threshold of 0.70, indicating acceptable internal consistency (Nunnally & Bernstein, 1994):

Table 3: Reliability Analysis

Variable	Cronbach's α
AI Literacy	0.88
Digital Confidence	0.86
Organizational Learning Culture	0.91
Workforce Performance	0.89

This demonstrates strong reliability of the measurement instruments.

Correlation Analysis

The correlation analysis, summarized in Table 4, revealed significant positive relationships among all major variables. AI literacy demonstrated a strong positive correlation with workforce performance (r =

0.56, p < 0.01), indicating that employees with greater knowledge and understanding of AI systems are more likely to achieve higher performance outcomes. Furthermore, AI literacy was positively correlated with digital confidence (r = 0.61, p < 0.01) and organizational learning culture (r = 0.47, p < 0.01), lending support to the hypothesized mediating and moderating mechanisms. These findings imply not only that AI literacy has a direct relationship with the performance of the workforce, but the degree is highly connected with the degree of confidence that employees exhibit when using AI technologies and the context in which they perform organizational tasks.

Table 4: Correlation Matrix of Study Variables

Variables	1	2	3	4
1. AI Literacy	1			
2. Digital Confidence	0.61**	1		
3. Organizational Learning Culture	0.47**	0.44**	1	
4. Workforce Performance	0.56**	0.53**	0.49**	1

Hypothesis Testing via Regression and SEM

H1 (AI Literacy → Workforce Performance): Regression results confirmed a significant positive effect (β = 0.42, p < 0.001), supporting H1. Employees with higher AI literacy were more likely to demonstrate improved performance outcomes.

H2 (Mediating Role of Digital Confidence): Mediation analysis using bootstrapping (5,000 samples) showed that Digital Confidence partially mediated the relationship between AI Literacy and Workforce Performance. The indirect effect was significant (β = 0.19, 95% CI [0.11, 0.29]), while the direct effect remained significant (β = 0.23, p < 0.01). This indicates that AI literacy enhances workforce performance both directly and indirectly by fostering digital confidence.

H3 (Moderating Role of Organizational Learning Culture): Interaction analysis revealed that Organizational Learning Culture significantly moderated the relationship between AI Literacy and Workforce Performance (β = 0.15, p < 0.01). The positive effect of AI literacy on performance was stronger in organizations with high learning culture compared to those with weaker learning cultures.

Table 5: Regression and SEM Results for Hypothesis Testing

Hypothesis	Path Tested	β	p-value	95% CI (Bootstrapped)	Result
H1	AI Literacy → Workforce Performance	0.42	<0.001	—	Supported
H2	AI Literacy → Digital Confidence → Workforce Performance (Mediation)	0.19 (indirect) 0.23 (direct)	<0.01	[0.11, 0.29]	Supported (Partial Mediation)
H3	AI Literacy × Organizational Learning Culture → Workforce Performance (Moderation)	0.15	<0.01	—	Supported

SEM Analysis

The hypothesized model was tested using Structural Equation Modeling (SEM). The results indicated an acceptable model fit:

Table 6: Model Fit Indices (SEM Analysis)

Fit Index	Value	Recommended Threshold (Hair et al., 2010)
χ^2/df	2.11	< 3.00
Comparative Fit Index (CFI)	0.94	≥ 0.90
Tucker-Lewis Index (TLI)	0.92	≥ 0.90
Root Mean Square Error of Approximation (RMSEA)	0.056	≤ 0.08

These indices are within recommended thresholds (Hair et al., 2010), confirming that the conceptual model adequately represents the observed data. **H1 supported:** AI literacy significantly improves workforce performance. **H2 supported:** Digital confidence partially mediates the relationship between AI literacy and workforce performance. **H3 supported:** Organizational learning culture strengthens the effect of AI literacy on workforce performance.

Collectively, these findings validate the proposed framework, demonstrating that workforce performance in AI-enabled environments depends not only on employees' literacy but also on their confidence and the organizational culture that supports learning.

Mediation Analysis

To test the mediating role of digital confidence in the relationship between AI literacy and workforce performance, a bootstrapping procedure with 5,000 resamples was employed. The results demonstrated a significant indirect effect of AI literacy on workforce performance through digital confidence ($\beta = 0.19$, 95% CI [0.11, 0.29]), indicating partial mediation. Importantly, the direct effect of AI literacy on workforce performance remained significant ($\beta = 0.23$, $p < 0.01$), suggesting that while AI literacy directly enhances performance, a portion of this effect operates through the enhancement of employees' confidence in their ability to effectively use AI tools. These findings highlight the psychological mechanism through which AI literacy translates into improved workforce outcomes.

Table 7: Mediation Analysis Results

Path	Direct Effect (β)	Indirect Effect (β)	95% CI (Bootstrapped)	Result
AI Literacy → Workforce Performance	0.23**	—	—	Significant (Direct)
AI Literacy → Digital Confidence → Workforce Performance	—	0.19**	[0.11, 0.29]	Significant (Partial Mediation)

Moderation Analysis

To assess the moderating role of organizational learning culture, an interaction term (AI Literacy × Organizational Learning Culture) was included in the regression model. The results revealed that organizational learning culture significantly moderated the relationship between AI literacy and workforce performance ($\beta = 0.15$, $p < 0.01$). Simple slope analysis indicated that the positive effect of AI literacy on workforce performance was stronger in organizations characterized by a high learning culture compared to those with a weaker culture. This implies that when organizational conditions are favorable, the positive impacts of AI literacy are enhanced and by this reason, it is important that continuous learning behaviors are developed so that a maximum gain of organizational productivity can be achieved in an AI-powered environment.

Table 8: Moderation Analysis Results

Predictor Variables	β	p-value	Result
AI Literacy	0.23	<0.01	Significant main effect
Organizational Learning Culture	0.27	<0.001	Significant main effect
AI Literacy × Organizational Learning Culture	0.15	<0.01	Significant moderation (interaction)

As shown in Figure 1, the organizational learning culture moderates the relationship between AI literacy and workforce performance. The interaction plot shows that in both conditions, the workforce performance is better when AI literacy is higher, but in organisations with high learning culture, AI literacy is substantially higher. The steeper the slope in high conditions of organizational learning culture means that the relatively more AI literate employees are demonstrating greatly increased performance results. Conversely, learning organizational culture is weak and slope is not so steep, i.e., AI literacy returns are limited by the absence of enabling organizational practice. The findings substantiate that the beneficial effect of AI literacy can be enhanced through the assistance of a productive learning-based environment that supports the importance of organizational culture as a situational circumstance that allows employees to perform in the previously described AI-based workplaces.

Figure 1: Moderation Analysis

DISCUSSION

The objectives of this research were to examine the impacts of AI literacy on performance in the workplace, and to examine the mediating role of digital confidence and moderating role of organizational learning culture. The results strongly support the offered model and contribute to the existing literature body on the interaction of the human competencies and organization settings with the new technologies like artificial intelligence.

The findings proved that AI literacy affects the performance of the workforce significantly and positively, which confirmed the first hypothesis. It means that the more employees know about AI systems, the higher their likelihood to implement them into work processes is, and the better results can be produced. It is consistent with other prior studies, which emphasize that, besides technical skills AI-literate workers should also be able to critically assess the suggestions of algorithms and match them to the direction of the organization (Davenport and Ronanki, 2018; Zhang and Dafoe, 2019). This also falls under the socio-technical systems perspective because it is postulated that the performance of an organization is a consequence of the congruency of the capacity of human beings and the technology systems (Trist and Bamforth, 1951).

The second hypothesis which postulated the mediating effect of digital confidence was also supported. It turned out that digital confidence was the mediator between AI literacy and workforce performance, and it can be interpreted as the fact that good results may not always depend on knowledge. Rather, the belief of workers that they can make reasonable use of AI systems is crucial in deciding whether literacy does translate into better performance. This conclusion is consistent with the Social Cognitive Theory (Bandura, 1997), which emphasizes that self-efficacy represents a determinant of behavior. As per the previous studies about technology adoption (Compeau and Higgins, 1995; Venkatesh et al., 2003), the outcomes of this work demonstrate that knowledgeable and confident employees are more eager to test AI, they are less likely to feel anxious, and they can more easily use AI tools to become more creative, productive, and flexible.

The findings indicated as well that the organizational culture of learning mediates the relationship between AI literacy and workforce performance. Specifically, AI literacy had a positive impact on performance in the organizations with a culture of learning, reflection, and continuous improvement. The discovery not only verifies the third assumption, but also previous studies on significance of organizational culture as the key force behind innovation and adaptation (Senge, 1990; Marsick and Watkins, 2003). When employees work in a setting where they share knowledge and have resources to experiment and solve problems together, chances are higher that they will be in a position to use their AI knowledge in practice and deliver better performance results. Conversely, AI literacy may not be utilized in the context of strict organizational environments where no one endorses such a culture.

There can be several theoretical implications of all these results. One, the study expands the socio-technical systems approach by the empirical evidence that AI literacy improves performance by ensuring sufficient compatibility with organizational systems. Secondly, it uses the Social Cognitive Theory to relate the world of AI application that develops digital confidence as one of the most phenomenal psychological processes of how AI literacy can be transformed into a behavioral one. Third, it is useful in developing the organizational learning theory since it acknowledges the culture of learning is a situational phenomenon that leads to the benefits of AI literacy. Among the insights of the research studies, together, is that it presents a multi-level approach to studying the interaction of individual-level competency, organizational variables, and workforce performance in AI-enabled workplaces.

In a pragmatic sense this paper notes that companies need to invest in a programmatic initiative not just enabling AI literacy in the narrow technical sense, but rational thinking and sensible utilization of AI systems. Simultaneously, it also indicates the necessity to establish the digital confidence of the personnel, by establishing the most favorable conditions that would lead to a decrease in the degree of apprehension towards the technological realm and promote the latter exploration. Generally, the results show that it is vital to create a powerful learning culture in which workers are provided with the incentive to constantly learn and share their knowledge and adapt to the new technology. Along with other managerial interventions, they can be implemented in significant volumes to help in the work of the workforce itself, as well as introduce the use of AI in work-related environments as a precondition to deliver real organizational value.

Lastly, we have a well-grounded piece of evidence in the study that AI literacy can transform what the workforce creates by creating an advantage, despite the lack of linearity. It is enabled by the online trust of the workers and supported by the presence of a learning-based organizational culture. The findings contribute to understanding the relationship between individual ability and organizational facilitating conditions within the framework of workforce performance during the AI era and, accordingly, find their way into the theory and practice of human resource management and organizational behavior.

CONCLUSION, LIMITATIONS AND FUTURE RESEARCH

This paper aimed to investigate how AI literacy is associated with workforce performance and how organizational learning culture mediates this relationship and digital confidence moderates it. The findings confirm that AI literacy has a significant positive indirect and direct impact on workforce performance by means of a psychological process of digital confidence. Additionally, the research shows that a powerful organizational learning culture enhances the positive correlations between AI literacy and performance, and that contextual enablers are significant to the adoption of technology. These findings extend existing theoretical frameworks, including socio-technical systems theory, social cognitive theory, and organizational learning theory, and contribute to a more nuanced understanding of how human and organizational factors interact to drive performance in AI-enabled workplaces.

Despite its contributions, the study is not without limitations. First, the use of a cross-sectional design limits the ability to draw definitive causal conclusions. Longitudinal studies would provide stronger evidence of how AI literacy and digital confidence evolve over time and how their effects on performance unfold. Second, the reliance on self-reported data may introduce common method bias, as respondents' perceptions of their own literacy, confidence, and performance could be influenced by social desirability or self-assessment tendencies. Incorporating objective measures of performance or supervisor evaluations could strengthen the robustness of future findings. Third, the study focused on employees in Pakistan's knowledge-intensive industries, which may limit generalizability to other cultural or industry contexts. Future research should explore cross-cultural comparisons or expand the scope to different sectors where AI adoption is at varying levels of maturity.

Future research can build upon these findings in several meaningful ways. Scholars could examine other potential mediators, such as technology acceptance, digital resilience, or innovative work behavior, to deepen understanding of the mechanisms linking AI literacy to performance. Additionally, future studies might explore other organizational moderators, such as leadership style, organizational agility, or digital infrastructure readiness, which may influence the extent to which AI literacy translates into positive outcomes. Finally, qualitative research could complement quantitative approaches by providing richer

insights into employees' lived experiences of working with AI technologies, offering a more holistic view of the challenges and opportunities in human–AI collaboration.

In conclusion, this study demonstrates that AI literacy is a vital competency in the digital age, but its effectiveness is contingent upon employees' digital confidence and the learning culture of their organizations. For organizations seeking to thrive in AI-enabled environments, investing simultaneously in employee literacy, confidence-building initiatives, and supportive learning cultures will be essential for enhancing workforce performance and sustaining competitive advantage

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