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ARTIFICIAL INTELLIGENCE READINESS, RESPONSIBLE LEADERSHIP, AND WORKFORCE AGILITY: EVIDENCE FROM PAKISTAN'S KNOWLEDGE ECONOMY

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ABSTRACT

Artificial intelligence (AI) is reshaping organizational processes, work requirements, and workforce *capabilities in Pakistan's knowledge economy. This study examines the relationship between AI readiness and workforce agility and tests the moderating role of responsible leadership. A quantitative, cross-sectional survey design was used with an illustrative sample of 384 valid responses from knowledge-intensive organizations in Pakistan. Data were analyzed using descriptive statistics, correlation, regression, and moderation analysis. AI readiness significantly predicted workforce agility (β = .36, $p < .001$), while responsible leadership showed a stronger positive effect (β = .41, $p < .001$). All four AI-readiness dimensions—technological, human/employee, organizational, and strategy/governance readiness—were significant predictors, with human/employee readiness showing the strongest effect (β = .28, $p < .001$). Responsible leadership also strengthened the AI-readiness–workforce-agility relationship (β = .15, $p < .001$). The findings indicate that AI transformation requires more than technology investment; organizations must simultaneously develop employee capabilities, organizational support, responsible leadership, and governance. The study extends Dynamic Capabilities Theory by positioning AI readiness as an organizational capability and responsible leadership as a contextual mechanism that facilitates its translation into workforce agility.*

Keywords: *Artificial intelligence readiness; responsible leadership; workforce agility; Dynamic Capabilities Theory; knowledge economy; Pakistan*

1. INTRODUCTION

Artificial intelligence has evolved from an emerging technology into an organizational capability affecting strategy, work design, decision-making, innovation, and competitiveness. Effective AI implementation requires technological infrastructure, quality data, employee skills, organizational support, strategic alignment, and governance. Thus, AI readiness is multidimensional rather than purely technological (Ali & Khan, 2025; Jöhnk et al., 2021).

The importance of AI readiness is especially evident in knowledge-intensive organizations, where employees must continuously learn, solve complex problems, collaborate, and adapt to changing technologies. AI can enhance information processing and decision support, but it can also alter jobs and create new skill

requirements. Workforce agility—comprising adaptability, proactivity, and resilience—is therefore an important outcome of AI-enabled transformation (Alviani et al., 2024).

Responsible leadership is equally important because AI adoption raises concerns about privacy, algorithmic bias, transparency, surveillance, accountability, and employment disruption. Responsible leaders provide direction, communicate change, support learning, involve employees, and balance organizational performance with stakeholder interests. These practices may determine whether AI readiness is translated into positive workforce outcomes.

Pakistan provides a relevant context because its knowledge economy includes IT, telecommunications, finance, education, professional services, research, and digital entrepreneurship. Although Pakistani research has begun examining organizational AI readiness, integrated evidence linking AI readiness, responsible leadership, and workforce agility remains limited. This study addresses that gap by examining AI readiness as a predictor of workforce agility and responsible leadership as both a direct predictor and a moderator.

2. PROBLEM STATEMENT

Organizations may invest substantially in AI technology without developing the human, organizational, strategic, and governance capabilities needed for effective implementation. In knowledge-intensive settings, this may result in employee resistance, underutilized technology, skill gaps, and weak adaptation. Existing research has examined AI readiness, responsible leadership, and workforce agility largely as separate streams, with limited integrated evidence from Pakistan. The central problem is therefore the insufficient empirical understanding of how AI readiness contributes to workforce agility and whether responsible leadership strengthens this relationship.

3. RESEARCH QUESTIONS

What is the level of AI readiness among knowledge-based organizations in Pakistan?

What is the relationship between AI readiness and workforce agility?

What is the relationship between responsible leadership and workforce agility?

Does responsible leadership moderate the AI-readiness–workforce-agility relationship?

Which AI-readiness dimensions contribute most strongly to workforce agility?

How can responsible leadership facilitate the translation of AI readiness into workforce agility?

4. RESEARCH OBJECTIVES

- Assess AI readiness among knowledge-based organizations in Pakistan.
- Examine the effect of AI readiness on workforce agility.
- Determine the relationship between responsible leadership and workforce agility.
- Examine the moderating effect of responsible leadership.
- Identify the AI-readiness dimensions with the strongest effects.
- Develop an integrated framework linking AI readiness, responsible leadership, and workforce agility.

5. SIGNIFICANCE OF THE STUDY

The study integrates AI readiness, responsible leadership, and workforce agility within a single framework and extends Dynamic Capabilities Theory (DCT) to an emerging knowledge-economy context. Practically, it highlights the need to combine technology investment with employee development, organizational learning, responsible governance, and leadership capability. For policymakers, the findings support broader initiatives in AI skills, reskilling, ethical AI governance, and industry–university collaboration.

6. LITERATURE REVIEW

6.1 Artificial Intelligence Readiness

AI readiness refers to an organization's preparedness to adopt, integrate, govern, and derive value from AI. It includes technology and data, people, processes, strategy, culture, leadership, and governance. Recent reviews identify AI readiness as a multidimensional capability, while Pakistan-specific evidence emphasizes people, processes, technology, strategy,

policies, and organizational environment (Ali & Khan, 2025; Jan et al., 2024).

6.2 AI Readiness and Workforce Agility

AI-ready organizations can provide employees with digital resources, training, learning opportunities, and structured processes that support adaptation. However, technology alone may not create agility if employees lack confidence, skills, or organizational support. Workforce agility is reflected in adaptability, proactivity, and resilience (Alviani et al., 2024).

6.3 Responsible Leadership and Workforce Agility

Responsible leadership emphasizes ethical conduct, accountability, transparency, stakeholder orientation, employee involvement, and long-term sustainability. In AI-enabled workplaces, responsible leaders can reduce uncertainty, support reskilling, encourage participation, and establish ethical boundaries. These conditions can facilitate employees' adaptability and proactive responses to technological change (Hossain et al., 2024).

6.4 Responsible Leadership as a Moderator

AI readiness provides resources for transformation, but leadership determines how those resources are introduced and experienced. When responsible leadership is strong, employees may be more willing to learn, experiment, and adapt; when leadership is weak, AI adoption may be perceived as threatening or imposed. Responsible leadership is therefore proposed as a boundary condition strengthening the AI-readiness–workforce-agility relationship.

6.5 Research Gap

Four gaps emerge: (1) AI-readiness research remains conceptually fragmented; (2) limited evidence links AI readiness with workforce outcomes; (3) responsible leadership has rarely been tested as a moderator of this relationship; and (4) integrated evidence across Pakistan's knowledge economy is limited. The present study addresses these gaps through an integrated model.

7. UNDERPINNING THEORY: DYNAMIC CAPABILITIES THEORY

Dynamic Capabilities Theory explains how organizations sense opportunities and threats, seize them through resource mobilization, and transform or reconfigure resources and processes in changing environments (Teece et al., 1997). AI readiness can be viewed as a dynamic capability because organizations must identify AI opportunities, invest in infrastructure and skills, and reconfigure work practices. Workforce agility represents a human-level outcome of this reconfiguration, while responsible leadership guides and governs the transformation process.

Theoretical model: AI Readiness → Workforce Agility; Responsible Leadership → Workforce Agility; AI Readiness × Responsible Leadership → Workforce Agility.

8. HYPOTHESES

H1: AI readiness has a significant positive effect on workforce agility.

H2: Responsible leadership has a significant positive effect on workforce agility.

H3: Responsible leadership strengthens the positive relationship between AI readiness and workforce agility.

H4: Technological readiness has a significant positive effect on workforce agility.

H5: Human/employee readiness has a significant positive effect on workforce agility.

H6: Organizational readiness has a significant positive effect on workforce agility.

H7: AI strategy and governance readiness have a significant positive effect on workforce agility.

9. METHODOLOGY

9.1 Research Design and Population

The study employed a quantitative, cross-sectional and deductive design. The population comprised employees, supervisors, and managers in knowledge-intensive organizations in Pakistan, including IT/software, telecommunications, banking and finance, higher education/research, professional services, e-commerce, and other technology-enabled organizations. Respondents were required to have at least one year of organizational experience.

9.2 Sampling and Sample Size

A multi-stage sampling strategy was used, combining purposive selection of relevant organizations, sector-based stratification, and respondent selection according to organizational access. Cochran's formula for large or unknown populations produced a minimum sample of approximately 384. The manuscript reports 430 questionnaires distributed and 384 usable responses (89.3% response rate).

Sector	Targeted	Usable
IT/software	90	82
Banking/finance	75	68
Telecommunications	55	49
Higher education/research	70	64
Professional/consulting	60	55
E-commerce/digital services	45	40
Other knowledge-intensive	35	26
Total	430	384

9.3 Measures

Data were collected through a structured questionnaire using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). AI readiness comprised technological, human/employee, organizational, and strategy/governance readiness. Responsible leadership covered ethical decision-making, accountability, transparency, stakeholder consideration, employee involvement, and social responsibility. Workforce agility comprised adaptability, proactivity, and resilience.

9.4 Reliability, Validity, and Ethics

The manuscript reports Cronbach's alpha, composite reliability, AVE, CFA, and HTMT procedures for assessing measurement quality. Participation was voluntary, confidentiality was maintained, and data were intended for academic use. Importantly, the source manuscript explicitly states that the numerical reliability and statistical results are illustrative and should be replaced with actual field-survey output before empirical submission. filecite turn1file0 L794-L825

10. RESULTS AND ANALYSIS

The results below reproduce the statistical findings reported in the source manuscript in a condensed form. The source identifies these values as illustrative and therefore they should not be presented as verified empirical results without checking them against the actual dataset. filecite turn1file0 L884-L900

10.1 Descriptive Statistics

Variable	M	SD
Technological AI readiness	3.71	0.72
Human/employee AI readiness	3.58	0.76
Organizational AI readiness	3.64	0.74
AI strategy/governance readiness	3.47	0.79
Overall AI readiness	3.6	0.67
Responsible leadership	3.76	0.7
Workforce adaptability	3.83	0.65
Workforce proactivity	3.69	0.7
Workforce resilience	3.77	0.67
Overall workforce agility	3.76	0.61

Overall AI readiness was moderate-to-high (M = 3.60), with technological readiness highest (M = 3.71) and strategy/governance readiness lowest (M = 3.47). Responsible leadership (M = 3.76) and

workforce agility (M = 3.76) were relatively high; adaptability was the highest agility dimension (M = 3.83).

10.2 Correlations

AI readiness was positively related to workforce agility ($r = .56$, $p < .01$), while responsible leadership showed a stronger correlation with workforce agility ($r = .61$, $p < .01$). AI readiness and responsible leadership were also positively correlated ($r = .56$, $p < .01$).

10.3 Regression Analysis

Predictor	β	p
AI readiness	0.36	< .001
Responsible leadership	0.41	< .001
Age	0.04	0.281
Education	0.07	0.083
Organizational tenure	0.06	0.132

Model: $R^2 = .45$; Adjusted $R^2 = .44$; $F(5, 378) = 61.84$, $p < .001$. AI readiness and responsible leadership significantly predicted workforce agility, while the demographic controls were not significant.

10.4 AI-Readiness Dimensions

Dimension	β	p
Technological readiness	0.19	< .001
Human/employee readiness	0.28	< .001
Organizational readiness	0.24	< .001
AI strategy/governance readiness	0.17	< .001

Model: $R^2 = .49$; Adjusted $R^2 = .48$; $F(4, 379) = 90.45$, $p < .001$. Human/employee readiness had the strongest effect, followed by organizational, technological, and strategy/governance readiness.

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10.5 Moderation Analysis

The AI readiness × responsible leadership interaction was positive and significant ($\beta = .15$, $p < .001$). Adding the interaction increased explained variance from $R^2 = .45$ to $R^2 = .47$ ($\Delta R^2 = .02$, $p < .001$), indicating that responsible leadership strengthened the positive relationship between AI readiness and workforce agility.

10.6 Hypothesis Testing

Hypothesis	β	p	Decision
H1	0.36	< .001	Supported
H2	0.41	< .001	Supported
H3	0.15	< .001	Supported
H4	0.19	< .001	Supported
H5	0.28	< .001	Supported
H6	0.24	< .001	Supported
H7	0.17	< .001	Supported

11. DISCUSSION

The findings indicate that AI readiness is positively associated with workforce agility, supporting the view that AI transformation depends on complementary technological, human, organizational, and governance capabilities. Responsible leadership showed an even stronger direct effect, suggesting that employees' responses to technological change are strongly shaped by the organizational environment created by leaders.

The moderation result provides the central contribution of the study: AI readiness produces stronger workforce outcomes when responsible leadership is high. Responsible leaders can communicate the purpose of AI adoption, support reskilling, encourage participation, reduce uncertainty, and address ethical concerns. Among AI-readiness dimensions, human/employee readiness had the strongest effect, reinforcing the importance of AI literacy, digital competence, confidence, and continuous learning.

Overall, the evidence supports an integrated view in which AI readiness supplies organizational capability, responsible leadership enables responsible implementation, and workforce agility represents an important human outcome of AI-enabled transformation.

12. THEORETICAL IMPLICATIONS

The study extends Dynamic Capabilities Theory in three ways. First, AI readiness is positioned as a capability for sensing, seizing, and reconfiguring around technological change. Second, workforce agility is identified as a human manifestation of organizational reconfiguration. Third, responsible leadership is introduced as a contextual capability that strengthens the conversion of technological resources into human and organizational outcomes.

13. MANAGERIAL AND POLICY IMPLICATIONS

- Assess AI readiness across technology, data, people, processes, strategy, and governance before major AI investments.
- Prioritize employee AI literacy, digital skills, reskilling, continuous learning, and human–AI collaboration.
- Develop responsible leaders who communicate AI-related change transparently and support employee participation.
- Establish responsible-AI governance covering privacy, accountability, transparency, bias, human oversight, and appropriate generative-AI use.
- Integrate AI strategy with human-resource planning and proactive reskilling.
- Promote industry–university collaboration for AI education, applied research, executive training, and workforce development.
- At policy level, strengthen national AI skills, responsible-AI governance, reskilling, and support for AI adoption in knowledge-intensive organizations.

14. LIMITATIONS

The cross-sectional design limits causal inference; self-reported data may introduce perception and common-method limitations; the focus on Pakistan's knowledge economy limits generalizability to other sectors; the non-probability component of sampling may reduce representativeness; and AI readiness was measured primarily through organizational perceptions rather than objective indicators. The model also excluded potentially relevant mechanisms such as organizational learning, psychological safety, trust in AI, digital culture, AI anxiety, and job insecurity.

15. FUTURE RESEARCH

Future studies should use longitudinal and multilevel designs, compare Pakistan with other emerging economies, conduct sector-specific analyses, and combine survey measures with objective indicators such as AI investment, infrastructure maturity, employee certifications, implementation intensity, and data maturity. Future models could also examine organizational learning, AI self-efficacy, psychological safety, trust in AI, digital culture, employee engagement, and continuous learning as mediators or moderators. Given the rapid diffusion of generative AI, separate research on generative-AI readiness and workforce agility is also warranted.

16. CONCLUSION

This study concludes that AI readiness and responsible leadership are significant predictors of workforce agility in Pakistan's knowledge economy. AI readiness contributes positively to employees' adaptability, proactivity, and resilience, while responsible leadership has a stronger direct association and significantly strengthens the AI-readiness–workforce-agility relationship. Human/employee readiness is the most influential AI-readiness dimension. Sustainable AI transformation therefore requires an integrated approach combining technology, people,

organizational capability, leadership, strategy, and governance.

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