

# The Impact of AI Technology Application on Vietnamese Employees' Innovative Behavior

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**Abstract:** The rapid advancement of artificial intelligence (AI) technology is profoundly reshaping organizational operations and employee work contexts. Based on the Job Demands-Resources (JD-R) Model, this study investigates the dual-path mechanism through which AI technology application influences employee innovative behavior. Using questionnaire data collected from 478 Vietnamese employees, we employed SPSS 22.0 and AMOS 29.0 to conduct reliability and validity tests and structural equation modeling analyses. The results reveal that: (1) job insecurity negatively affects employee innovative behavior, while perceived opportunities positively affect employee innovative behavior; (2) job insecurity partially mediates the relationship between AI technology application and employee innovative behavior; (3) perceived opportunities fully mediate the relationship between AI technology application and employee innovative behavior; and (4) AI knowledge negatively moderates the relationship between AI technology application and job insecurity, while positively moderating the relationship between AI technology application and perceived opportunities. This study extends the understanding of AIs dual effects on employee behavior and provides practical implications for organizational management in the AI era.

**Keywords:** AI technology application; AI knowledge; Job insecurity; Perceived opportunities; Innovative behavior.

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## 1. Introduction

The rapid development of artificial intelligence (AI) technology, particularly generative AI, is continuously iterating and accelerating its penetration into various organizational contexts (Yam et al., 2022). While AI technology is widely applied in fields such as new energy vehicles and assisted healthcare, it is also gradually embedding itself into enterprise production and management practices, profoundly reshaping organizational operation modes and employee work contexts (Loureiro et al., 2023).

In the Vietnamese labor market, AI technology is expanding its coverage across multiple domains and aspects of daily life. AI tools automate processes such as invoice classification, financial forecasting, and compliance checks in the financial and accounting sectors. In healthcare, AI assists in disease diagnosis and medical image analysis. In manufacturing, AI optimizes production processes and manages supply chains. However, alongside these promising developments, certain industries face notable challenges (Kim & Kim, 2024).

While people enjoy the convenience brought by the rapid development of AI, they simultaneously question their own meaning and value, develop panic about future uncertainty, and consequently experience psychological insecurity (Lysyakov & Viswanathan, 2021). Good mental health is an important foundation for the successful implementation of career development plans. However, during the widespread application of AI technology, employees may experience job insecurity due to uncertainties brought by technological change. If this insecurity accumulates over time, it may negatively affect employees mental health.

The rapid development of AI has dual effects on employees innovative work behavior. On one hand, AIs limitations may stimulate employees to perceive opportunities, prompting them to find new solutions where technology falls short, thereby enhancing innovation capabilities. On the other hand, when employees collaborate

with AI assistants, the efficiency and convenience of AI, robots, and algorithms may trigger anxiety about being replaced. This sense of crisis may bring psychological pressure, weaken innovation motivation, and even hinder the implementation of innovative behaviors.

Previous research has shown that AI technology application threatens employees job security, causes negative emotions, and triggers a series of negative behaviors such as turnover or deviance, adversely affecting organizations (Yam et al., 2022; Lysyakov & Viswanathan, 2021). A few studies have found that integrating AI in the workplace positively impacts employee well-being, potentially generating more positive emotions (Loureiro et al., 2023). Employees adaptation to technology is often influenced by personal, job, and organizational factors (Kim & Kim, 2024). Current research on AI technology application primarily focuses on the macro level, with less attention to employees responses to this phenomenon. At the micro level, most studies tend to explore the negative impacts of AI technology application, while research on its potential positive effects remains scarce. Furthermore, there is a lack of comprehensive perspectives that analyze employees responses to AI technology application and their underlying mechanisms.

Therefore, this study, based on the JD-R Model, focuses on employees reactions to AI technology application and its impact on employee innovative behavior, exploring the influence mechanism from a comprehensive perspective. Specifically, the study constructs two influence paths: one where AI technology application produces positive effects through perceived opportunities, and another where AI technology application produces negative effects by increasing job insecurity. Additionally, the study deeply analyzes the moderating role of employees AI knowledge level in these paths, comprehensively revealing employees coping mechanisms regarding AI technology application.

## 2. Theoretical Basis and Hypotheses

### 2.1. Theoretical Foundation: Job Demands-Resources Model

This study adopts the Job Demands-Resources (JD-R) Model as its overall theoretical framework. The JD-R Model, first proposed by Demerouti et al. (2001), posits that work characteristics can be divided into two categories: job demands, which continuously consume employees' psychological and cognitive resources, and job resources, which help enhance employees' work motivation and performance.

Within the JD-R framework, job demands primarily affect employee attitudes and behavioral outcomes through a "health impairment path," while job resources promote positive work behaviors through a "motivational path" (Bakker & Demerouti, 2007, 2017). Subsequent research has further indicated that personal resources (such as knowledge, skills, and self-efficacy) can not only directly influence employee outcome variables but also moderate the strength of job demands and job resources on employee behavior (Schaufeli & Taris, 2014).

In the context of AI technology application, the same technological change often possesses dual attributes of both "job demands" and "job resources," providing an important theoretical foundation for explaining the paradoxical effects of AI technology on employee innovative behavior.

### 2.2. Research Hypotheses

#### 2.2.1. AI Technology Application, Job Insecurity, and Perceived Opportunities

Job insecurity refers to employees' subjective uncertainty and anxiety regarding their job stability and career continuity when facing changes in the work environment. In the context of rapid AI development, employees' work content, job boundaries, and skill requirements are constantly changing, providing an important contextual basis for the emergence of job insecurity.

First, AI technology possesses the capability to autonomously analyze and execute tasks, and in some work scenarios, it can directly replace or diminish the value of employee labor. This technological substitution does not necessarily mean immediate unemployment, but it weakens employees' perception of their own irreplaceability, causing them to have ongoing concerns about future career prospects. When engaging in self-assessment, employees easily view AI as a potential competitor, thereby amplifying their perception of threats to job stability.

Second, the introduction of AI technology is typically accompanied by work process reengineering and job structure adjustment. Original task allocations are reconfigured, job skill thresholds continuously rise, and employees need to continuously invest learning costs to adapt to new work requirements. This continuous pressure to update abilities makes employees more aware that their skills may become obsolete, thereby enhancing their job insecurity.

Therefore, within the JD-R framework, AI technology application can be viewed as a contextual factor that increases job demands by enhancing job insecurity. Based on this, we propose:

**H1: AI technology application positively affects job insecurity.**

Perceived opportunities refer to employees' subjective feelings about the autonomous control space they have in

resource acquisition, work arrangement, and work method selection during their work process. In the JD-R Model, perceived opportunities are considered important job resources, whose core function is to stimulate employees' work motivation and initiative.

The application of AI technology creates new resource contexts for employees. On one hand, AI systems can handle a large number of repetitive and procedural tasks, thereby freeing up employees' time and energy resources. This resource release effect enables employees to plan their work pace more flexibly and invest limited resources in more creative and challenging tasks, enhancing their sense of control over work arrangements.

On the other hand, AI technology provides employees with more accurate information support through intelligent analysis and decision support, reducing uncertainty in the work process. In this context, employees can independently adjust work strategies and methods based on technological support, significantly enhancing their autonomy in choosing work methods. Furthermore, AI technology's continuous learning capability provides possibilities for employees to explore new skills and roles, making it easier for them to view technological change as a source of career development opportunities.

Based on this, we propose:

**H2: AI technology application positively affects perceived opportunities.**

#### 2.2.2. Job Insecurity, Perceived Opportunities, and Employee Innovative Behavior

Innovative behavior inherently possesses high uncertainty and risk of failure, requiring employees to have sufficient psychological security and resource support. However, job insecurity, as a persistent job demand, continuously consumes employees' psychological and cognitive resources, thereby inhibiting their willingness to participate in innovative activities.

In situations of high job insecurity, employees' attention is more likely focused on risk avoidance and self-protection, with behavioral strategies tending toward conservatism, preferring to follow established processes and mature practices rather than attempting new methods with uncertain outcomes. Existing research indicates that job insecurity triggers negative psychological reactions such as anxiety, tension, and emotional exhaustion, which significantly reduce employees' cognitive flexibility and creative thinking ability.

From the perspective of Conservation of Resources (COR) Theory, individuals are always committed to acquiring, maintaining, and protecting their important resources; when perceiving that key resources may be lost, individuals prioritize defensive behaviors to avoid further depletion (Hobfoll, 1989; Hobfoll et al., 2018). In organizational contexts, job stability, career prospects, and income expectations are considered core work resources that employees highly value. Once these resources are threatened, employees tend to reduce high-investment, high-risk behavioral choices.

Innovative behavior is essentially a typical resource investment behavior, requiring employees to continuously invest time, energy, and psychological resources, and bear certain risks of failure. Therefore, when employees are in a state of high job insecurity, their attention is more likely focused on risk avoidance and self-protection, thereby inhibiting their willingness and ability to participate in innovative activities. Based on this, we propose:

**H3: Job insecurity negatively affects employee innovative behavior.**

As a key job resource, perceived opportunities can promote employee innovative behavior through multiple mechanisms. When employees perceive more work opportunities, their work engagement and intrinsic motivation levels significantly increase, making them more willing to actively explore new methods and ideas.

High levels of perceived opportunities not only enhance employees autonomy experience but also improve their cognitive flexibility, making it easier for them to understand work problems from different perspectives and transform challenges into innovation opportunities. Additionally, perceived opportunities can promote employees to actively integrate organizational resources and engage in more active collaboration with colleagues and leaders, thereby facilitating the generation and implementation of innovative ideas. Based on this, we propose:

**H4: Perceived opportunities positively affects employee innovative behavior.**

**2.2.3. Mediating Roles of Job Insecurity and Perceived Opportunities**

From the above analysis, it can be seen that AI technology application does not directly inhibit employee innovative behavior but indirectly influences it by changing employees psychological perceptions of job stability. Specifically, the job restructuring, skill pressure, and substitution expectations triggered by AI technology enhance employees job insecurity, and this insecurity, through resource consumption and risk avoidance mechanisms, reduces the likelihood of employees participating in innovative activities.

Therefore, in the impairment path, job insecurity constitutes a key mediating variable between AI technology application and employee innovative behavior. Based on this, we propose:

**H5: AI technology application negatively affects employee innovative behavior through job insecurity.**

In the motivational path, AI technology application indirectly promotes innovative behavior by changing employees resource structure. Specifically, the time resources, information resources, and decision support released by AI technology enable employees to form more positive perceptions of development opportunities and autonomous space in their work, and this perceived opportunity further stimulates their innovation motivation and innovative behavior.

Therefore, perceived opportunities play a key mediating role between AI technology application and employee innovative behavior. Based on this, we propose:

**H6: AI technology application positively affects employee innovative behavior through perceived opportunities.**

**2.2.4. Moderating Role of AI Knowledge**

Although AI technology application simultaneously triggers both impairment and motivational paths, different employees show significant differences in their sensitivity to these two paths. AI knowledge, as a key individual capability factor, provides an important perspective for explaining these differences.

In the impairment path, employees with higher levels of AI knowledge can typically better understand the operational logic and application boundaries of AI technology, thereby reducing fear of technological substitution. They are more inclined to view AI as a tool to enhance their own capabilities

rather than as a job threat, so the positive impact of AI technology application on their job insecurity is relatively weaker. Conversely, employees with insufficient AI knowledge are more likely to amplify technological risk expectations, thereby strengthening insecurity.

In the motivational path, employees with higher AI knowledge levels are better at utilizing the resources released by AI technology, actively exploring new opportunities and roles, thereby further amplifying the positive impact of AI technology application on perceived opportunities. Based on this, we propose:

**H7: AI knowledge negatively moderates the relationship between AI technology application and job insecurity.**

**H8: AI knowledge positively moderates the relationship between AI technology application and perceived opportunities.**

**2.3. Research Model**

Based on the JD-R Model, this study constructs a dual-path mechanism model of AI technology application influencing employee innovative behavior. Job insecurity constitutes an impairment path centered on resource consumption, perceived opportunities constitute a motivational path oriented toward resource gain, and AI knowledge serves as a key boundary condition, moderating the strength of AI technology applications effects on the two paths.

**3. Methods**

**3.1. Sample and Data Collection**

Data were collected through the Credamo paid survey platform, targeting employed individuals in Northern Vietnam who use AI-related technologies in their actual work. A total of 602 questionnaires were collected. After excluding 35 questionnaires from respondents who did not use AI technology in their work and 89 questionnaires with **obvious patterned responses**, 478 valid questionnaires were obtained, yielding an effective response rate of 79.40%.

Among the valid samples, 46.03% were male and 53.97% were female. Regarding education level, 3.34% had high school education or below, 9.41% had associate degrees, 61.29% had bachelors degrees, 18.61% had masters degrees, and 2.51% had doctoral degrees, indicating that respondents generally had relatively high education levels. The age structure was predominantly 18-29 years (38.07%), followed by 30-40 years (29.70%), 40-50 years (21.54%), and over 50 years (5.23%).

**3.2. Variable Measurement**

All variables were measured using 5-point Likert scales (1 = strongly disagree to 5 = strongly agree).

**AI Technology Application (AITA):** Adapted from Tangs scale, consisting of four items: "I frequently use AI-related technologies in my daily work," "Some parts of my work tasks rely on AI system assistance," "My company actively promotes the application of AI technology in work processes," and "AI technology has become an indispensable tool in my work."

**AI Knowledge (AIK):** Adapted from Chiu and Zhus (2021) revision of Flynn and Goldsmiths (1999) subjective knowledge scale, consisting of four items: "I understand the basic operating principles and main types of AI," "I am clear about the typical application scenarios of AI technology in our

industry," "I can identify which work content is suitable for execution by AI systems," and "I possess the basic knowledge to apply AI technology to my own work."

**Innovative Behavior (IB):** Adapted from Scott and Bruces (1994) scale, consisting of four items: "I often proactively propose new ideas to improve work processes," "I am willing to try introducing AI technology into work practices to enhance efficiency," "I actively seek innovative solutions when facing problems," and "I encourage colleagues to try new technologies or work methods to improve work outcomes."

**Perceived Opportunities (PO):** Adapted from Bala and Venkateshs (2016) scale, consisting of four items: "I believe the application of AI technology will provide new opportunities for my career development," "I think AI allows me to focus on more valuable work content," "The introduction of AI technology has increased my likelihood of achieving results at work," and "I feel that the application of AI gives me opportunities to continuously enhance my personal abilities and competitiveness."

**Job Insecurity (JI):** Adapted from Brougham and Haars (2018) STARA awareness scale, appropriately revised for the AI technology application context, consisting of four items: "I worry that AI technology will replace my current job position," "I feel uncertain about my future career stability in the company," "I think with the advancement of AI, my responsibilities may be weakened or transferred," and "I am concerned about the career risks that may arise from the accelerated development of AI applications."

### 3.3. Data Analysis Strategy

SPSS 22.0 and AMOS 29.0 were used for data analysis.

**Table 1.** Means, Standard Deviations, and Correlations

Variable	M	SD	1	2	3	4	5
1. AITA	3.494	0.657	1				
2. AIK	3.496	0.648	0.209**	1			
3. IB	3.491	0.668	0.249**	0.116*	1		
4. PO	3.498	0.662	0.455**	0.149**	0.422**	1	
5. JI	3.481	0.659	0.392**	0.250**	-0.220**	-0.129**	1

\*Note: \*\*  $p < 0.01$ , \*  $p < 0.05$ \*

### 4.3. Main Effects Tests

**H1 proposed that AITA positively affects JI.** After controlling for demographic variables, AITA significantly positively affected JI ( $\beta = 0.386$ ,  $p < 0.001$ ), supporting H1.

**H2 proposed that AITA positively affects PO.** After controlling for demographic variables, AITA significantly positively affected PO ( $\beta = 0.460$ ,  $p < 0.001$ ), supporting H2.

**H3 proposed that JI negatively affects IB.** After controlling for demographic variables, JI significantly negatively affected IB ( $\beta = -0.228$ ,  $p < 0.001$ ), supporting H3.

**H4 proposed that PO positively affects IB.** After controlling for demographic variables, PO significantly positively affected IB ( $\beta = 0.428$ ,  $p < 0.001$ ), supporting H4.

### 4.4. Mediating Effects Tests

**H5 proposed that AITA negatively affects IB through JI.** As shown in Table 2, after including JI in the model, the effect of AITA on IB remained significant ( $\beta = 0.396$ ,  $p < 0.001$ ), and JI significantly negatively affected IB ( $\beta = -0.381$ ,  $p < 0.001$ ). Bootstrap analysis showed that the indirect effect of AITA on IB through JI was  $-0.147$  (95% CI  $[-0.188, -0.106]$ ), not containing zero, indicating that JI partially

mediated the relationship. Thus, H5 was supported.

## 4. Results

### 4.1. Reliability and Validity

All variables demonstrated good internal consistency, with Cronbachs  $\alpha$  coefficients of 0.785 for AITA, 0.773 for AIK, 0.806 for IB, 0.800 for PO, and 0.787 for JI. Composite reliability (CR) values for all variables exceeded 0.7.

Confirmatory factor analysis showed that the five-factor model (AITA, AIK, IB, PO, JI) fit the data well ( $\chi^2/df = 1.014$ , RMSEA = 0.005, CFI = 0.999, TLI = 0.998, SRMR = 0.031), significantly better than alternative models, indicating good discriminant validity among the constructs.

Harmans single-factor test showed that the first factor explained 18.956% of the total variance, below the 40% threshold, indicating that common method bias was not a serious concern.

### 4.2. Descriptive Statistics and Correlations

Table 1 presents the means, standard deviations, and correlations among the study variables. AITA was significantly positively correlated with JI ( $r = 0.392$ ,  $p < 0.01$ ), PO ( $r = 0.455$ ,  $p < 0.01$ ), AIK ( $r = 0.209$ ,  $p < 0.01$ ), and IB ( $r = 0.249$ ,  $p < 0.01$ ). JI was significantly negatively correlated with IB ( $r = -0.220$ ,  $p < 0.01$ ), while PO was significantly positively correlated with IB ( $r = 0.422$ ,  $p < 0.01$ ).

mediated the relationship. Thus, H5 was supported.

**Table 2.** Mediating Effect of Job Insecurity

Variable	Model 1 (JI)	Model 2 (IB)	Model 3 (IB)	Model 4 (IB)
Control	Included	Included	Included	Included
AITA	0.386***	0.249***		0.396***
JI			-0.228***	-0.381***
R <sup>2</sup>	0.168	0.064	0.054	0.182
F	19.013***	6.416***	5.351***	17.413***

\*Note: \*\*\*  $p < 0.001$ \*

**H6 proposed that AITA positively affects IB through PO.** As shown in Table 3, after including PO in the model, the effect of AITA on IB became non-significant ( $\beta = 0.066$ ,  $p > 0.05$ ), and PO significantly positively affected IB ( $\beta = 0.398$ ,  $p < 0.001$ ). Bootstrap analysis showed that the indirect effect of AITA on IB through PO was  $0.183$  (95% CI  $[0.135, 0.229]$ ), not containing zero, indicating that PO fully mediated the

relationship. Thus, H6 was supported.

**Table 3.** Mediating Effect of Perceived Opportunities

Variable	Model 1 (PO)	Model 2 (IB)	Model 3 (IB)	Model 4 (IB)
Control	Included	Included	Included	Included
AITA	0.460***	0.249***		0.066
PO			0.428***	0.398***
R <sup>2</sup>	0.215	0.064	0.182	0.186
F	25.750***	6.416***	21.021***	17.875***

\*Note: \*\*\* p < 0.001\*

#### 4.5. Moderating Effects Tests

**H7 proposed that AIK negatively moderates the relationship between AITA and JI.** As shown in Table 4, the interaction term (AITA × AIK) significantly negatively affected JI ( $\beta = -0.158$ ,  $p < 0.01$ ). Simple slope analysis (Figure 2) revealed that the positive effect of AITA on JI was stronger when AIK was low ( $\beta = 0.452$ ,  $p < 0.001$ ) than when AIK was high ( $\beta = 0.248$ ,  $p < 0.001$ ), supporting H7.

**Table 4.** Moderating Effect of AI Knowledge on AITA-JI Relationship

Variable	Model 1	Model 2	Model 3
Control	Included	Included	Included
AITA	0.386***	0.349***	0.350***
AIK		0.184***	0.179***
AITA × AIK			-0.158**
R <sup>2</sup>	0.168	0.199	0.211
ΔR <sup>2</sup>	0.168	0.031	0.012
F	19.013***	19.431***	17.876***

\*Note: \*\*\* p < 0.001, \*\* p < 0.01\*

**H8 proposed that AIK positively moderates the relationship between AITA and PO.** As shown in Table 5, the interaction term (AITA × AIK) significantly positively affected PO ( $\beta = 0.205$ ,  $p < 0.001$ ). Simple slope analysis (Figure 3) revealed that the positive effect of AITA on PO was stronger when AIK was high ( $\beta = 0.581$ ,  $p < 0.001$ ) than when AIK was low ( $\beta = 0.316$ ,  $p < 0.001$ ), supporting H8.

**Table 5.** Moderating Effect of AI Knowledge on AITA-PO Relationship

Variable	Model 1	Model 2	Model 3
Control	Included	Included	Included
AITA	0.460***	0.450***	0.449***
AIK		0.047	0.055
AITA × AIK			0.205***
R <sup>2</sup>	0.215	0.217	0.237
ΔR <sup>2</sup>	0.215	0.002	0.020
F	25.750***	21.672***	20.767***

\*Note: \*\*\* p < 0.001\*

## 5. Discussion

### 5.1. Summary of Findings

This study, based on the JD-R Model, constructed and empirically tested a dual-path mechanism through which AI technology application influences employee innovative behavior. The main findings are as follows:

First, AI technology application positively affects both job insecurity and perceived opportunities. This finding confirms that AI technology in organizational contexts possesses dual

attributes, simultaneously increasing job demands and providing job resources, consistent with previous research (Raisch & Krakowski, 2021; Kim & Kim, 2024).

Second, job insecurity negatively affects employee innovative behavior, while perceived opportunities positively affect employee innovative behavior. This aligns with the JD-R Models propositions that job demands impair positive outcomes through health impairment, while job resources promote positive outcomes through motivation (Bakker & Demerouti, 2017).

Third, job insecurity partially mediates the relationship between AI technology application and employee innovative behavior, while perceived opportunities fully mediate this relationship. These findings reveal that AI technology application influences employee innovative behavior through two distinct psychological mechanisms: an impairment path centered on resource consumption and a motivational path oriented toward resource gain. The full mediation effect of perceived opportunities suggests that AI technology applications positive impact on innovative behavior is completely dependent on enhancing employees opportunity perceptions, consistent with previous findings on the importance of cognitive appraisal in technology adoption (Cheng & Hackney, 2021).

Fourth, AI knowledge negatively moderates the AITA-JI relationship and positively moderates the AITA-PO relationship. This indicates that employees with higher AI knowledge levels are better equipped to understand AI technologies logic and boundaries, thereby reducing threat perceptions and better identifying opportunities. This finding extends subjective knowledge theory to the AI context and confirms AI knowledges role as a critical personal resource (Raisch et al., 2023).

### 5.2. Theoretical Implications

This study makes several theoretical contributions. First, it extends the JD-R Model to the AI application context, demonstrating that the same technological change can simultaneously function as both a job demand and a job resource. By constructing and testing a dual-path model, this study provides a more comprehensive understanding of AI technologies complex effects on employee behavior.

Second, this study addresses the relative lack of research on AIs positive effects in existing literature. While previous studies have predominantly focused on AIs negative impacts such as job insecurity and anxiety (Yam et al., 2022), this study reveals that AI technology application can also positively influence employee behavior by enhancing perceived opportunities.

Third, this study introduces AI knowledge as a key boundary condition, demonstrating its differential moderating effects on the two paths. This contributes to understanding individual differences in responses to AI technology and extends subjective knowledge theory to the organizational AI context.

Fourth, by focusing on Vietnamese employees, this study provides empirical evidence from an emerging economy context, contributing to cross-cultural understanding of AIs effects on employee behavior.

### 5.3. Practical Implications

This study offers several practical implications for organizations implementing AI technology. First, organizations should recognize that AI technology

application has dual effects on employees. While promoting AI adoption for efficiency gains, managers must attend to employees' psychological reactions, particularly job insecurity, which can undermine innovation.

Second, organizations should actively cultivate employees' opportunity perceptions regarding AI technology. This can be achieved by clearly communicating how AI can enhance rather than replace human work, providing development opportunities related to AI, and creating supportive environments for AI-related learning and experimentation.

Third, organizations should invest in enhancing employees' AI knowledge. Training programs that help employees understand AI's principles, applications, and boundaries can reduce unnecessary fear and enable employees to better leverage AI for innovation. Such knowledge serves as a valuable personal resource that buffers negative effects and amplifies positive effects of AI technology.

Fourth, managers should adopt differentiated approaches based on employees' AI knowledge levels. For employees with lower AI knowledge, more support and reassurance may be needed to mitigate insecurity. For those with higher AI knowledge, organizations can provide more autonomy and opportunities for AI-related innovation.

#### 5.4. Limitations and Future Research Directions

This study has several limitations that suggest directions for future research. First, the cross-sectional design limits causal inferences. Future research could employ longitudinal designs to examine how the effects of AI technology application on employee behavior evolve over time, particularly as AI technology continues to develop and employees accumulate experience with AI.

Second, the reliance on self-reported data may introduce common method bias. Future studies could incorporate multi-source data, such as supervisor ratings of innovative behavior or objective measures of AI usage, to enhance validity.

Third, this study focused on individual-level mechanisms. Future research could examine cross-level influences, such as how organizational AI culture or team AI climate moderates individual responses to AI technology. Additionally, exploring other potential mediators such as psychological empowerment or creative self-efficacy could further enrich understanding.

Fourth, while this study examined AI knowledge as a moderator, other individual differences such as learning goal orientation, technology readiness, or personality traits may also influence responses to AI technology and warrant investigation.

Finally, this study was conducted in Vietnam, and findings may not generalize to other cultural contexts. Cross-cultural comparative studies could examine how national culture influences employees' interpretations of and responses to AI technology.

## 6. Conclusions

Based on the Job Demands-Resources Model, this study constructed and empirically tested a dual-path mechanism through which AI technology application influences employee innovative behavior. The findings reveal that: (1) job insecurity negatively affects employee innovative behavior, while perceived opportunities positively affect employee innovative behavior; (2) job insecurity partially

mediates the relationship between AI technology application and employee innovative behavior; (3) perceived opportunities fully mediate this relationship; and (4) AI knowledge negatively moderates the AITA-JI relationship and positively moderates the AITA-PO relationship. These findings contribute to understanding the complex effects of AI technology on employee behavior and provide practical guidance for organizations navigating AI implementation.

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