The Double-Edge Sword Impact of Artificial Intelligence Support on Employee Innovation Behavior

Tomi Sah[1*], Dinar Purwati[2], Reniati[3], and Devi Valeriani[4]

[1,2,3,4] Universitas Bangka Belitung, Bangka Belitung Islands Province 33172, Indonesia
*tomisah33@gmail.com

Abstract. As artificial intelligence (AI) increasingly replaces human roles in the workplace, the importance of creative tasks for humans is growing. While AI can enhance employee innovation behavior, some studies indicate it may also negatively impact employees' psychological well-being. This research investigates the dual influence of AI support on employee innovation behavior, with creative self-efficacy and STARA (Smart Technology, AI, Robotics, and Algorithm) awareness serving as mediating variables. Employing a quantitative methodology, data were gathered through a survey targeting civil servants at the National Population and Family Planning Board of the Bangka Belitung Islands Province. Structural Equation Modeling (SEM) was conducted using Smart PLS 3 software to assess the relationships between variables. The findings reveal that AI support significantly enhances creative self-efficacy, positively influencing employee innovation behavior. While AI support negatively affects STARA awareness, STARA awareness does not significantly impact innovation behavior. The mediation analysis confirms that creative self-efficacy mediates the relationship between AI support and innovation, while STARA awareness does not. This study advances the understanding of AI's role in shaping employee behavior while emphasizing the importance of fostering creative self-efficacy to enhance innovation and address concerns related to technological disruption.

Keywords: Innovation Behavior, AI Support, STARA Awareness, Creative Self-Efficacy.

1 Introduction

Artificial intelligence (AI) denotes sophisticated and intricate systems capable of performing cognitive functions commonly attributed to human intelligence, including interaction, learning, and problem-solving. [1]. AI is reshaping the relationship between humans and technology by transferring decision-making from people to machines, making it a key component of Industry 4.0 [2]. With its potential to substantially boost labor productivity [3], AI has recently integrated into the core operations of approximately 80% of large companies [4]. Advances in AI enable AI assistants to perform complex tasks, adapt to changes, and learn from users and their environments. However, AI remains limited in creative problem-solving, a domain where humans still

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excel. In the future, AI is expected to take over cognitive and analytical tasks [5], while humans focus on managing AI systems and engaging in creative, emotional tasks [6]. Effective collaboration between humans and AI can give organizations a competitive edge, but this requires motivated employees who are encouraged to innovate [7]. Promoting employee innovation is essential for success in the digital era.

As highlighted by the Society for Industrial and Organizational Psychology's report on leading workplace trends, AI continues to be a significant factor shaping almost all aspects of organizational operations [8]. This has heightened the focus on AI's impact on employee innovation, with many scholars suggesting that AI generally enhances employee creativity and innovation. 1sz However, highly capable AI can also negatively affect employees' psychological well-being through their awareness of smart technology, AI, robotics, and algorithms (STARA), as concerns about their future roles may lead to avoidance behaviors, potentially hindering innovation. In light of these conflicting views, this study diverges from previous research by proposing that AI's impact on employee innovation behavior has positive and negative dimensions. The objective is to uncover AI support's dual, or "double-edged sword," effects on employee innovation behavior.

Although prior research has thoroughly investigated the positive effects of AI on employee innovation, the majority of these studies have concentrated on private-sector organizations, leaving the public sector and government institutions comparatively underexplored. Additionally, the dual nature of AI and its potential to enhance innovation and negatively affect employee well-being remains underexplored. Existing research often overlooks the possible negative consequences of AI, particularly in terms of psychological effects and employee apprehension, which may suppress innovation. This study aims to fill these gaps by focusing on the public sector and investigating AI support's complex and potentially contradictory impacts on employee innovation behavior. This research is significant as it addresses a critical gap in the literature by exploring the effects of AI on employee innovation behavior within the public sector. Given the increasing integration of AI technologies in government operations, understanding how AI influences public employees' creativity and innovation is essential for optimizing its use. Furthermore, this study's focus on both the positive and negative impacts of AI provide a more comprehensive understanding of AI's role in shaping innovation, offering valuable insights for policymakers and organizational leaders in managing AI integration to enhance productivity while mitigating any adverse effects on employee well-being.

2 Methods

This study chose civil servants from the National Population and Family Planning Board of Bangka Belitung Islands Province as the respondents. A questionnaire was distributed through Google Forms using a saturation sampling technique to recruit respondents. A total of 46 respondents (98% Response Rate) completed the questionnaire between August 12 and 30, 2024. The AI Support, creative self-efficacy, and STARA awareness were assessed using indicators proposed by Yin et al. [1], while the

employee innovation behavior was evaluated using indicators proposed by Yam et al. [9]. The responses were assessed using a 5-point Likert scale. To process the data, Stata/MP 17.0 was employed to analyze the characteristics of the respondents, while Smart PLS3 was utilized for the core data analysis. Structural Equation Modeling (SEM) was conducted through Smart PLS-3 software to evaluate the relationships.

3 Results and Discussions

3.1 Results

As AI increasingly takes over tasks traditionally performed by humans, the significance of human creativity in the workplace is growing. While AI can potentially enhance employees' innovative behaviors, some research indicates it may also negatively impact them. A total of 46 individuals participated in the study, with the majority being female (63.04%) and the remaining male (36.96%). The largest group was between 31-40 years old, accounting for 52.17% of the respondents, followed by those above 40 (41.30%). The educational background of the respondents shows that 80.43% hold a bachelor's degree or a diploma IV, while 10.87% have completed a diploma III, and only 6.52% have attained a master's degree. Regarding their job positions, most respondents fall within Grade 3 (80.43%), while Grade 4 and Grade 2 account for 10.87% and 8.70%, respectively. The tenure of the respondents indicates that the majority have been employed for 11-15 years (54.35%), with smaller proportions having worked 16-20 years (17.39%), 0-5 years (13.04%), and over 20 years (8.70%).

Before performing bootstrapping, the researcher conducted tests for convergent validity, discriminant validity, and reliability. All research indicators exhibit outer loading values > 0.7, while all variables have an AVE (Average Variance Extracted) >0.5. These results demonstrate that the indicators and variables meet the required thresholds for convergent validity, confirming their validity for this study. Additionally, according to the discriminant validity test results, the AVE's square root is higher than the values of different variables, suggesting that the variables are accessible from discriminant validity concerns. In addition to assessing convergent and discriminant validity, the researcher also evaluated the reliability of the research variables. As shown in Table 3, all variables have Cronbach's alpha values exceeding 0.60 and composite reliability values above 0.70, confirming that all variables are reliable and acceptable.

Based on the path coefficient analysis, the impact of AI support on creative self-efficacy produced a β value of 0.000. In contrast, the effect of creative self-efficacy on employee innovation behavior yielded a β value of 0.000, demonstrating a positive and significant relationship (H_1 and H_3 Supported). The p-value for the effect of AI support on STARA awareness was 0.000, with a t-statistic of -0.878, indicating a negative and significant influence (H_2 Supported). On the other hand, the p-value for the effect of STARA awareness on employee innovation behavior was 0.141, with a t-statistic of -0.280, reflecting a negative but insignificant influence (H_4 Rejected). Additionally, the analysis of the indirect effect of AI support on employee innovation behavior, mediated by creative self-efficacy, showed positive β values and a p-value of 0.001, confirming that creative self-efficacy mediates these relationships (H_5 Supported). However, the

analysis of the indirect effect of AI support on employee innovation behavior through STARA awareness revealed β values of 0.246 and a p-value of 0.153, indicating that STARA awareness does not mediate these relationships (H_6 Rejected).

Table 1. Path Coefficient & Specific Indirect Effects

Relationship	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
X -> Z1	0.901	0.900	0.037	24.648	0.000
X -> Z2	-0.878	-0.873	0.049	18.032	0.000
Z1 - > Y	0.612	0.601	0.186	3.286	0.001
Z2 -> Y	-0.280	-0.293	0.190	1.476	0.141
X -> Z1 -> Y	0.551	0.539	0.162	3.401	0.001
X -> Z2 -> Y	0.246	0.257	0.172	1.431	0.153

3.2 Discussions

The Effect of AI Support on Creative Self-Efficacy and STARA Awareness

The analysis revealed contrasting effects of AI support on creative self-efficacy and STARA awareness. AI support positively impacts creative self-efficacy, with a β value of 0.901 and a t-statistic of 24.648 (p-value 0.000). AI boosts employees' confidence in problem-solving and innovation by simplifying tasks, enhancing decision-making, and fostering creativity. It enables them to focus on higher-level activities, improving their belief in their creative abilities, aligning with findings from Dahri et al. [10], Dong et al. [11], Kim et al. [12], and Koeszegi [13]. In contrast, AI support negatively impacts STARA awareness, with a β value of -0.878 and a t-statistic of 18.032 (p-value 0.000). As AI integration grows, employees perceive a higher risk of job displacement, creating anxiety about job security and career progression. This aligns with studies by Kang et al. [14], Lingmont & Alexiou [15], and Suvarna et al. [16].

The Effect of Creative Self-Efficacy on Employee Innovation Behavior.

The analysis of path coefficients indicates that creative self-efficacy positively impacts employee innovation behavior, as demonstrated by a β value of 0.612. Additionally, the t-statistic is 3.286, with a p-value of 0.000, signifying statistical significance at the 0.05 level. These results substantiate the conclusion that creative self-efficacy substantially and positively affects employee innovation behavior. Employees who exhibit higher confidence in problem-solving with AI and the ability to generate innovative ideas tend to engage more actively in innovation-related activities. This heightened self-belief, fostered by adaptability to new AI tools and creative collaboration, encourages employees to experiment with new solutions, implement innovative ideas, and collaborate to drive continuous improvement. As a result, individuals with creative, solid self-efficacy are more likely contributing to the overall innovation capacity of the institutoion, reinforcing the crucial role of self-efficacy in promoting a culture of innovation. In support of earlier research conducted by Sun et al. [17],Yan & Loang [18], and Yuan et al. this study found that creative self efficacy has a positive and significant

impact on employee innovation behavior, confirming the robustness of this relationship across different settings.

The Effect of STARA Awareness on Employee Innovation Behavior

The bootstrapping analysis results indicate that the effect of STARA awareness on employee innovation behavior yields a β value of -0.280, suggesting a negative effect. Moreover, the p-value of 0.141, which exceeds the 0.05 threshold, indicates that this effect is not statistically significant. Consequently, it can be concluded that STARA awareness does not significantly affect employee innovation behavior. Employees who are aware of the potential risks of STARA, such as job displacement and concerns about job security, may feel apprehensive about their role in the future workforce. This heightened concern could dampen their willingness to engage in innovative activities, as the fear of obsolescence or career instability may lead to risk aversion. However, while STARA awareness might evoke some level of concern, it does not meaningfully hinder employees' ability to generate ideas, implement solutions, or measurably collaborate for innovation. Other factors, such as organizational support or the perceived benefits of innovation, may buffer the negative influence of STARA awareness on innovation behavior. Although previous studies conducted by Kang et al. [14], Lingmont & Alexiou [15], Martin & Hauret [19], and Oosthuizen [20], have consistently found that STARA awareness negatively affects employee innovation behavior, the result of this study indicated that the effect is statistically insignificant, suggesting that the negative relationship may not hold in this context.

The Effect of AI Support on Employee Innovation Behavior through Creative Self-Efficacy

Based on the bootstrapping analysis of the research variables, the results indicate that the effect of AI support and employee innovation behavior, mediated by creative self-efficacy, have a coefficient value of $\beta = 0.551$ with a p-value of 0.001, below the 0.05 threshold, indicating statistical significance. Therefore, it can be concluded that creative self-efficacy significantly mediates the influence of AI support on employee innovation behavior. AI support enhances employees' confidence in problem-solving, adaptability to AI tools, and ability to collaborate creatively. This increased self-efficacy, in turn, encourages employees to generate new ideas, experiment with innovative solutions, and continuously improve their work processes. By fostering a sense of competence and creativity in using AI, creative self-efficacy strengthens the positive effects of AI support on employee innovation behavior, demonstrating that employees who feel capable of leveraging AI are more likely to engage in innovative activities. This mediation effect underscores the importance of providing AI tools and empowering employees with the self-confidence to effectively use them in driving innovation. The results align with previous studies conducted by Dahri et al. [10], Dong et al. [11], Kim et al. [12], and Koeszegi which consistently report that creative self-efficacy mediates the influence of AI support on employee innovation behavior.

The Effect of AI Support on Employee Innovation Behavior through STARA Awareness

The bootstrapping analysis shows that the relationship between AI support and employee innovation behavior, mediated by STARA awareness, yields a coefficient value of $\beta = 0.246$. A p-value of 0.153 exceeds the 0.05 threshold, showing that the effect is statistically insignificant. Therefore, it can be concluded that STARA awareness does not mediate the impact of AI support on employee innovation behavior. Although employees may be aware of the potential risks posed by STARA technologies, such as job displacement or concerns about future career security, these concerns do not significantly influence their engagement in innovation activities. Employees might separate their awareness of STARA's disruptive potential from their day-to-day work, focusing more on the immediate benefits of AI support, such as decision-making enhancement and process simplification. Additionally, organizations may provide a supportive environment that buffers the adverse effects of STARA awareness, allowing employees to focus on innovation without being overly hindered by concerns about job security. Thus, while employees are conscious of the risks associated with STARA, this awareness does not directly impact their innovation behavior in a significant way. In contrast to earlier studies conducted by Kang et al. [14], Lingmont & Alexiou [15], and Martin & Hauret [19], that identified STARA awareness as a significant factor in mediating the relationship between AI support and employee innovation behavior, this study found that STARA awareness does not mediate this relationship, pointing to potential moderating variables or specific conditions that weaken this association.

4 Conclusion

This study offers significant contributions to understanding the dual-edged impact of AI support on employee innovation behavior, particularly through the mediating roles of creative self-efficacy and STARA awareness. The findings demonstrate that AI support positively and significantly influences creative self-efficacy, empowering employees to engage confidently in problem-solving and innovative activities. Creative self-efficacy is a crucial mediator in the relationship between AI support and employee innovation behavior, reinforcing the critical role of fostering employees' belief in their creative capabilities when utilizing AI. This suggests that organizations should focus on enhancing employees' creative self-efficacy to maximize the innovative potential of AI. Conversely, STARA awareness indicates that while employees recognize the risks posed by AI-related technologies, such as job displacement and career uncertainty, these concerns do not significantly affect their engagement in innovation. STARA awareness does not mediate the relationship between AI support and employee innovation behavior, implying that other factors, such as immediate organizational support or the perceived benefits of AI in simplifying tasks and decision-making, may diminish the negative effects of such concerns.

Aside from effectively addressing the research hypotheses, this study is subject to certain limitations and offers opportunities for future research. The cross-sectional design restricts the ability to evaluate the long-term impact of AI support on innovation

behavior, which could be better understood through a longitudinal approach. The study also does not account for potential moderating factors, such as leadership and organizational culture, that could provide a comprehensive understanding of the relationships examined. Furthermore, the measurement tools used may not fully capture the complexity of AI integration, highlighting the need for refined instruments in future research.

References

1. Yin, M., Jiang, S., & Niu, X. (2024). Can AI really help? The double-edged sword effect of AI assistant on employees' innovation behavior. *Computers in Human Behavior, 150*(October 2023).
2. Raisch, S., & Krakowski, S. (2021). Artificial intelligence and management: The automation–augmentation paradox. *Academy of Management Review, 46*(1), 192–210.
3. Brynjolfsson, E., Rock, D., & Syverson, C. (2021). The productivity J-curve: How intangibles complement general purpose technologies. *American Economic Journal: Macroeconomics, 13*(1), 333–372.
4. Ghosh, B., Wilson, H. J., Burden, A., & Daugherty, P. R. (2024). Taking a systems approach to adopting AI. *Harvard Business Review.* Retrieved September 11, 2024, from https://hbr.org/2019/05/taking-a-systems-approach-to-adopting-ai
5. Huang, M.-H., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of Service Research, 21*(2), 155–172.
6. Huang, M.-H., & Rust, R. T. (2020). Engaged to a robot? The role of AI in service. *Journal of Service Research, 24*(1), 30–41.
7. Makarius, E. E., Mukherjee, D., Fox, J. D., & Fox, A. K. (2020). Rising with the machines: A sociotechnical framework for bringing artificial intelligence into the organization. *Journal of Business Research, 120*, 262–273.
8. Society for Industrial and Organizational Psychology (SIOP). (2020). Top 10 workplace trends for 2020. Retrieved September 11, 2024, from https://www.siop.org/Research-Publications/Items-of-Interest/ArtMID/19366/ArticleID/3361/Top-10-Workplace-Trends-for-2020
9. Yam, K. C., Goh, E.-Y., Fehr, R., Lee, R., Soh, H., & Gray, K. (2022). When your boss is a robot: Workers are more spiteful to robot supervisors that seem more human. *Journal of Experimental Social Psychology, 102*, 104360.
10. Dahri, N. A., et al. (2024). Investigating AI-based academic support acceptance and its impact on students' performance in Malaysian and Pakistani higher education institutions. *Education and Information Technologies.*
11. Dong, X., et al. (2024). Let's talk about AI: Talking about AI is positively associated with AI crafting. *Asia Pacific Journal of Management.*
12. Kim, J., Lee, H., & Cho, Y. H. (2022). Learning design to support student-AI collaboration: Perspectives of leading teachers for AI in education. *Education and Information Technologies, 27*(5), 6069–6104.
13. Koeszegi, S. T. (2024). AI @ work: Human empowerment or disempowerment? In H. Werthner, C. Ghezzi, J. Kramer, J. Nida-Rümelin, B. Nuseibeh, E. Prem, & A. Stanger (Eds.), *Introduction to digital humanism: A textbook* (pp. 175–196). Cham: Springer Nature Switzerland.

14. Kang, D. Y., Hur, W.-M., & Shin, Y. (2023). Smart technology and service employees' job crafting: Relationship between STARA awareness, performance pressure, receiving and giving help, and job crafting. *Journal of Retailing and Consumer Services, 73*, 103282.
15. Lingmont, D. N. J., & Alexiou, A. (2020). The contingent effect of job automating technology awareness on perceived job insecurity: Exploring the moderating role of organizational culture. *Technological Forecasting and Social Change, 161*, 120302.
16. Suvarna, S., Aranha, R., Sathiyaseelan, & Basavaraj, S. (2024). Empowering gender equality in business sustainability: A STARA (smart technologies, artificial intelligence, robotics, and algorithms)-centric exploration of socio-technological innovation for modern business environments. In A. Hamdan & A. Harraf (Eds.), *Business development via AI* (pp. 1093–1102). Cham: Springer Nature Switzerland.
17. Sun, Z.-Y., Li, J.-M., Li, B., & He, X.-Y. (2024). Digital leadership and deviant innovation: The roles of innovation self-efficacy and employee ambitions. *Current Psychology, 43*(26), 22226–22237.
18. Yan, W. Y., & Loang, O. K. (2024). Building a research model for the relationship between enterprise innovation values and employees' innovation behavior: With innovation self-efficacy as a mediator. In R. El Khoury (Ed.), *Technology-driven business innovation: Unleashing the digital advantage, Volume 1* (pp. 55–65). Cham: Springer Nature Switzerland.
19. Martin, L., & Hauret, L. (2020). Digitalization, job quality, and subjective well-being. In K. F. Zimmermann (Ed.), *Handbook of labor, human resources and population economics* (pp. 1–41). Cham: Springer International Publishing.
20. Oosthuizen, R. M. (2019). Smart technology, artificial intelligence, robotics and algorithms (STARA): Employees' perceptions and wellbeing in future workplaces. In I. L. Potgieter, N. Ferreira, & M. Coetzee (Eds.), *Theory, research and dynamics of career wellbeing: Becoming fit for the future* (pp. 17–40). Cham: Springer International Publishing.