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THE ROLE OF AI SELF-EFFICACY IN ACTUAL AI TOOL USE: EVIDENCE FROM AN EXTENDED TECHNOLOGY ACCEPTANCE MODEL

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Abstract

This study examines the role of AI self-efficacy in enhancing employees' actual use of artificial intelligence (AI) tools through the mediating roles of perceived ease of use, perceived usefulness, and behavioral intention within the Technology Acceptance Model (TAM). As AI technologies become increasingly integrated into workplace activities, understanding the factors that drive employees' actual AI usage has become an important issue, particularly in the banking sector. A quantitative research design was employed using survey data collected from 100 employees of commercial banks in Banyumas Raya, Indonesia, who had experience using AI tools such as ChatGPT, Google Gemini, and Microsoft Copilot. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The findings reveal that AI self-efficacy has a positive and significant effect on perceived ease of use and perceived usefulness. Furthermore, perceived ease of use and perceived usefulness significantly influence behavioral intention, which subsequently has a positive effect on the actual use of AI tools. The findings also confirm the mediating roles of perceived ease of use and perceived usefulness in linking AI self-efficacy to behavioral intention. This study extends the Technology Acceptance Model by incorporating AI self-efficacy as an antecedent of technology acceptance and provides practical implications for commercial banks in strengthening employees' AI capabilities to encourage effective and sustainable AI adoption.

Keywords: AI self-efficacy; Technology Acceptance Model; behavioral intention; actual system use; commercial banking

INTRODUCTION

Artificial intelligence (AI) has emerged as one of the most transformative technologies in the digital era, fundamentally reshaping organizational processes by improving operational efficiency, accelerating information processing, supporting decision-making, and enhancing employee productivity. Recent advances in generative AI have further expanded these capabilities, enabling employees to perform knowledge-intensive tasks such as document drafting, information summarization, data analysis, and idea generation with greater speed and accuracy. Consequently, organizations across various industries, including the banking sector, have increasingly adopted AI tools such as ChatGPT, Google Gemini, and Microsoft Copilot to support daily business operations. Despite their growing availability, the successful implementation of AI technologies depends not only on technological infrastructure but also on employees' willingness and capability to utilize these tools effectively in their work activities. Therefore, understanding the factors that drive employees' actual use of AI tools has become an important issue in information systems and organizational research.

The Technology Acceptance Model (TAM) remains one of the most widely adopted theoretical frameworks for explaining individuals' acceptance and usage of new technologies. TAM

proposes that users' perceptions regarding the ease of using a technology (Perceived Ease of Use) and its usefulness for improving job performance (Perceived Usefulness) influence their Behavioral Intention, which subsequently determines Actual System Use. Although TAM has been extensively applied to explain technology adoption behavior, the emergence of AI-based technologies introduces new challenges because AI systems require users not only to operate digital tools but also to interact with adaptive systems, evaluate AI-generated outputs, and continuously refine prompts and instructions. These characteristics suggest that employees' confidence in their capability to use AI technologies may play a more prominent role than in conventional information systems.

AI Self-Efficacy has recently been recognized as a critical psychological factor influencing AI adoption behavior. Derived from Bandura's (1997) concept of self-efficacy, AI Self-Efficacy refers to an individual's confidence in their ability to understand, operate, and effectively utilize AI technologies to accomplish work-related tasks. Employees with higher AI Self-Efficacy are more likely to explore AI functionalities, overcome operational difficulties, and recognize the practical benefits of AI technologies, thereby developing stronger perceptions of ease of use and usefulness (Falebita & Kok, 2025; Zhao et al., 2025). Previous studies have consistently demonstrated that AI Self-Efficacy positively influences Perceived Ease of Use and Perceived Usefulness. In addition, Perceived Ease of Use and Perceived Usefulness significantly affect Behavioral Intention toward AI adoption Alshammari & Babu, 2025; Li (2023); and Mokmin and Neoh (2023).

Although previous studies have established the relationships among these constructs, several research gaps remain. First, most existing studies have been conducted in higher education, manufacturing industries, or general organizational settings (Zhao et al. 2025), Lan et al. (2026), Mokmin and Neoh (2023), whereas empirical evidence from the commercial banking sector remains limited. Second, previous studies generally examine only partial relationships among AI Self-Efficacy, Perceived Ease of Use, Perceived Usefulness, Behavioral Intention, and Actual System Use, while studies integrating these variables into a single Technology Acceptance Model are still scarce, particularly in regional banking institutions. This limitation is important because commercial banks increasingly rely on AI technologies to improve employee effectiveness, operational efficiency, and service quality, making employees' acceptance and actual utilization of AI tools strategically important.

Accordingly, this study aims to examine the role of AI Self-Efficacy in enhancing the Actual System Use of AI tools through the mediating roles of Perceived Ease of Use, Perceived Usefulness, and Behavioral Intention among employees of commercial banks in Banyumas Raya, Indonesia. The novelty of this study lies in extending the Technology Acceptance Model by incorporating AI Self-Efficacy as an external antecedent that simultaneously influences Perceived Ease of Use and Perceived Usefulness, which function as parallel mediators leading to Behavioral Intention and ultimately Actual System Use. The findings indicate that AI Self-Efficacy significantly enhances employees' perceptions of ease of use and usefulness, both of which strengthen Behavioral Intention and subsequently increase the actual use of AI tools. Theoretically, this study contributes to the development of the Technology Acceptance Model by providing empirical evidence regarding the role of AI Self-Efficacy in explaining AI adoption behavior within the commercial banking sector. Practically, the findings provide valuable insights for commercial banks in designing AI competency development programs, strengthening employees' confidence in utilizing AI technologies, and promoting sustainable AI adoption to improve organizational performance.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

The Technology Acceptance Model (TAM), proposed by Davis (1989), is one of the most widely adopted theories for explaining users' acceptance and utilization of information technologies. TAM posits that technology usage behavior is primarily influenced by two cognitive beliefs: Perceived Ease of Use (PEOU) and Perceived Usefulness (PU). Perceived Ease of Use refers

to the degree to which an individual believes that using a particular technology requires minimal effort, whereas Perceived Usefulness reflects the extent to which an individual believes that technology enhances job performance. These beliefs shape users' Behavioral Intention (BI), which subsequently determines their Actual System Use (ASE). Due to its strong explanatory power, TAM has been extensively applied to investigate the adoption of emerging technologies, including artificial intelligence (AI).

In the context of AI adoption, technology acceptance is not solely determined by users' perceptions of AI technologies but also by their confidence in utilizing such technologies effectively. Based on Social Cognitive Theory Bandura (1997), self-efficacy refers to an individual's belief in their capability to organize and execute actions required to accomplish specific tasks. Extending this concept, AI Self-Efficacy (AISE) represents employees' confidence in their ability to understand, operate, and effectively utilize AI technologies in performing work-related activities.

Employees with higher AI Self-Efficacy are expected to perceive AI systems as easier to use because they possess greater confidence in exploring AI features and overcoming operational challenges. In addition, confident employees are more likely to recognize the benefits of AI in improving work performance and productivity. Previous studies consistently reported that AI Self-Efficacy positively influences both Perceived Ease of Use and Perceived Usefulness (Lan et al., 2026; Mokmin & Neoh, 2023; Zhao et al., 2025). For research with hypothesis testing, hypothesis Therefore, the following hypotheses are proposed:

H1: AI Self-Efficacy positively influences Perceived Ease of Use.
H2: AI Self-Efficacy positively influences Perceived Usefulness.

Within TAM, Perceived Ease of Use and Perceived Usefulness are regarded as the primary determinants of Behavioral Intention. Employees who perceive AI technologies as easy to operate are more likely to develop favorable attitudes toward their use. Likewise, when AI tools are perceived as beneficial for improving work performance, employees tend to exhibit stronger intentions to adopt them. These relationships have been consistently supported in previous studies on AI adoption (Li, 2023; Alshammari & Babu, 2025). Accordingly, the following hypotheses are proposed:

H3: Perceived Ease of Use positively influences Behavioral Intention.
H4: Perceived Usefulness positively influences Behavioral Intention.

Behavioral Intention represents an individual's willingness to use a technology and is considered the most immediate predictor of Actual System Use. Employees who possess stronger intentions to use AI are more likely to incorporate AI tools into their daily work activities. Previous studies have consistently confirmed the significant relationship between Behavioral Intention and Actual System Use (Pratama et al., 2022; Na et al., 2023). Therefore, the following hypothesis is proposed:

H5: Behavioral Intention positively influences Actual System Use.

In addition to the direct relationships, TAM suggests that cognitive beliefs may also function as mediating mechanisms. Employees with high AI Self-Efficacy are expected to develop stronger Behavioral Intention because they perceive AI technologies as easier to use and more useful. Consequently, Perceived Ease of Use and Perceived Usefulness are expected to mediate the relationship between AI Self-Efficacy and Behavioral Intention. Previous studies have reported similar mediation effects in AI and digital technology adoption contexts (Li, 2023; Zhao et al., 2025). Therefore, the following hypotheses are proposed:

H6: Perceived Ease of Use mediates the relationship between AI Self-Efficacy and Behavioral Intention.
H7: Perceived Usefulness mediates the relationship between AI Self-Efficacy and Behavioral Intention.

RESEARCH METHODS

This study employed a quantitative research approach using a cross-sectional survey design to examine the relationships among AI Self-Efficacy, Perceived Ease of Use, Perceived Usefulness, Behavioral Intention, and Actual System Use of AI tools among employees of commercial banks in Banyumas Raya. The research model was developed based on the Technology Acceptance Model (TAM), incorporating AI Self-Efficacy as an external antecedent influencing Perceived Ease of Use and Perceived Usefulness, which subsequently affect Behavioral Intention and Actual System Use.

The population consisted of employees working at commercial banks located in Banyumas Raya, including Purwokerto, Cilacap, Purbalingga, and Banjarnegara. Respondents were selected using purposive sampling based on two criteria: (1) being employed at a commercial bank in Banyumas Raya and (2) having experience using artificial intelligence (AI) tools, such as ChatGPT, Google Gemini, Microsoft Copilot, Claude AI, or similar applications, to support work-related activities. Since the exact population size was unknown, the minimum sample size was determined using Cochran's formula, resulting in a minimum requirement of 96 respondents. A total of 102 questionnaires were collected, of which 100 valid responses were retained for further analysis. Participation in the study was voluntary, and respondents were informed that their responses would remain anonymous and be used solely for academic purposes.

Primary data were collected through a structured online questionnaire using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The measurement instruments were adapted from established studies. AI Self-Efficacy was measured using five indicators adapted from (Bandura, 1997; Falebita & Kok, 2025; Zhao et al., 2025). Perceived Ease of Use and Perceived Usefulness were each measured using five indicators adapted from (Davis, 1989; Li, 2023). Behavioral Intention was measured using six indicators adapted from Mokmin & Neoh (2023) and Li (2023), while Actual System Use was measured using five indicators adapted from (Davis, 1989; Falebita & Kok, 2025; Li, 2023).

The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4 software. The analysis included descriptive statistics, evaluation of the measurement model (outer model) through assessments of indicator reliability, internal consistency reliability, convergent validity, and discriminant validity, followed by evaluation of the structural model (inner model) to examine the proposed hypotheses and mediation effects.

RESULTS AND DISCUSSION

A total of 102 questionnaires were collected from employees of commercial banks in Banyumas Raya. After the data screening process, two questionnaires were excluded because they did not meet the research criteria, resulting in 100 valid responses for further analysis. The respondents represented employees from various commercial banks in Purwokerto, Cilacap, Purbalingga, and Banjarnegara who had experience using artificial intelligence (AI) tools in their work activities. Most respondents were aged between 31 and 40 years and had experience using AI applications, particularly ChatGPT, Google Gemini, and Microsoft Copilot, for various work-related activities, including brainstorming, document summarization, writing assistance, and information retrieval.

Table 1 Descriptive Statistics of Research Variables

Variable	Mean	Category
AI Self-Efficacy	3.62	High
Perceived Ease of Use	3.66	High
Perceived Usefulness	3.61	High
Behavioral Intention	3.62	High
Actual System Use	3.66	High

Source: Processed Data (2026)

Table 1 shows that all research variables obtained relatively high mean scores. Perceived Ease of Use and Actual System Use recorded the highest average score (3.66), followed by AI Self-Efficacy and Behavioral Intention (3.62), while Perceived Usefulness obtained an average score of 3.61. These findings indicate that employees generally possess positive perceptions toward AI technologies and actively utilize AI tools in their daily work activities.

Table 2 Reliability and Validity Assessment

Construct	Cronbach's alpha	Composite reliability (ρA)	Composite reliability (ρC)	Average variance extracted (AVE)
AI Self-Efficacy	0.878	0.886	0.911	0.673
Actual System Use	0.879	0.883	0.912	0.676
Behavioral Intention	0.911	0.918	0.931	0.695
Perceived Ease of Use	0.902	0.908	0.928	0.719
Perceived Usefulness	0.854	0.868	0.900	0.694

Source: SmartPLS Output (2026)

As presented in Table 2, all constructs demonstrated satisfactory reliability and convergent validity. Cronbach's Alpha, Composite Reliability (ρA and ρC), and Average Variance Extracted (AVE) all exceeded the recommended thresholds of 0.70 and 0.50, respectively. These findings indicate that the measurement model possesses adequate internal consistency and convergent validity, confirming that the indicators reliably measure their respective constructs.

Table 3 Discriminant Validity (HTMT)

Item	AI Self-Efficacy	Actual System Use	Behavioral Intention	Perceived Ease of Use	Perceived Usefulness
AI Self-Efficacy					
Actual System Use	0.336				
Behavioral Intention	0.406	0.448			

Perceived Ease of Use	0.599	0.133	0.443	
Perceived Usefulness	0.500	0.157	0.464	0.275

Source: SmartPLS Output (2026)

Table 3 presents the results of the discriminant validity assessment using the Heterotrait-Monotrait Ratio (HTMT). All HTMT values were below the recommended threshold of 0.90, indicating that each construct was empirically distinct from the others. These findings confirm that the measurement model achieved satisfactory discriminant validity, indicating that each construct adequately captures a distinct concept within the proposed research model.

Table 4 Coefficient of Determination (R^2)

Endogenous Variable	R^2
Perceived Ease of Use	0.298
Behavioral Intention	0.271
Perceived Usefulness	0.196
Actual System Use	0.163

Source: SmartPLS Output (2026)

Table 4 presents the coefficient of determination (R^2) for the endogenous constructs. Perceived Ease of Use obtained the highest explanatory power ($R^2 = 0.298$), indicating that AI Self-Efficacy explained approximately 29.8% of its variance. Behavioral Intention and Perceived Usefulness achieved R^2 values of 0.271 and 0.196, respectively, while Actual System Use recorded an R^2 value of 0.163. These results indicate that the proposed model demonstrates weak to moderate explanatory power in explaining employees' AI adoption behavior.

Table 5 Effect Size (f^2)

Relationship	f^2	Effect Size
AI Self-Efficacy → Perceived Ease of Use	0.425	Large
AI Self-Efficacy → Perceived Usefulness	0.243	Medium
Perceived Ease of Use → Behavioral Intention	0.130	Small
Perceived Usefulness → Behavioral Intention	0.152	Medium
Behavioral Intention → Actual System Use	0.195	Medium

Source: SmartPLS Output (2026)

Table 5 reports the effect size (f^2) of each structural relationship. AI Self-Efficacy exerted a large effect on Perceived Ease of Use ($f^2 = 0.425$) and a medium effect on Perceived Usefulness ($f^2 = 0.243$). Meanwhile, Perceived Ease of Use, Perceived Usefulness, and Behavioral Intention demonstrated small to medium effect sizes on their respective endogenous constructs. Overall, AI Self-Efficacy emerged as the most influential predictor in the structural model, particularly in explaining employees' perceptions regarding the ease of using AI technologies.

Table 6 Hypothesis Testing

Hypothesis	Path	Path Coefficient (β)	T Statistics	P Values	Decision
H1	AISE → PEOU	0.546	7.833	0.000	Accepted
H2	AISE → PU	0.442	5.591	0.000	Accepted
H3	PEOU → BI	0.317	3.329	0.001	Accepted
H4	PU → BI	0.343	4.191	0.000	Accepted
H5	BI → ASE	0.404	4.942	0.000	Accepted
H6	AISE → PEOU → BI	0.173	2.899	0.004	Accepted
H7	AISE → PU → BI	0.152	2.980	0.003	Accepted

Source: SmartPLS Output (2026)

As presented in Table 6, all proposed hypotheses were empirically supported. AI Self-Efficacy significantly influenced Perceived Ease of Use (β = 0.546, p < 0.001) and Perceived Usefulness (β = 0.442, p < 0.001). Both Perceived Ease of Use (β = 0.317, p = 0.001) and Perceived Usefulness (β = 0.343, p < 0.001) had a significant positive effect on Behavioral Intention, while Behavioral Intention positively affected Actual System Use (β = 0.404, p < 0.001). Furthermore, mediation analysis indicated that Perceived Ease of Use (β = 0.173, p = 0.004) and Perceived Usefulness (β = 0.152, p = 0.003) partially mediated the relationship between AI Self-Efficacy and Behavioral Intention, suggesting that employees' confidence in using AI enhances adoption intention both directly and indirectly through positive technology perceptions.

The findings of this study confirm that AI Self-Efficacy plays an important role in shaping employees' perceptions and adoption of AI tools. Employees with higher confidence in using AI tend to perceive AI technologies as easier to use and more useful in supporting their work. These findings support the Technology Acceptance Model (Davis, 1989) and Social Cognitive Theory (Bandura, 1997), suggesting that individual capability beliefs influence technology acceptance.

Furthermore, Perceived Ease of Use and Perceived Usefulness significantly enhanced Behavioral Intention, while Behavioral Intention positively affected Actual System Use. These results indicate that employees are more likely to adopt AI when they perceive it as beneficial and easy to integrate into their daily work activities. The findings are consistent with previous studies by Li (2023); Na et al. (2023); Zhao et al. (2025) and Falebita & Kok (2025), confirming the applicability of TAM in explaining AI adoption behavior.

Overall, this study demonstrates that successful AI implementation in commercial banks depends not only on technological availability but also on employees' confidence and positive perceptions toward AI. Therefore, organizations should strengthen AI competencies through continuous training and organizational support to encourage sustainable AI adoption.

CONCLUSION

This study examined the influence of AI Self-Efficacy on Actual System Use of AI tools through Perceived Ease of Use, Perceived Usefulness, and Behavioral Intention among employees of commercial banks in Banyumas Raya. The findings indicate that AI Self-Efficacy significantly influences Perceived Ease of Use and Perceived Usefulness, while both variables significantly increase Behavioral Intention, which subsequently affects Actual System Use. In addition, Perceived Ease of Use and Perceived Usefulness partially mediate the relationship between AI Self-Efficacy and Behavioral Intention. These findings support the Technology Acceptance Model Davis (1989) and reinforce previous studies highlighting the importance of AI Self-Efficacy in promoting AI adoption (Falebita & Kok, 2025; Zhao et al., 2025).

The findings provide practical implications for commercial banks in Banyumas Raya. Organizations should strengthen employees' AI competencies through continuous AI training, user-friendly AI systems, and organizational support that increases employees' confidence in using AI tools. These initiatives are expected to improve employees' perceptions of AI usefulness and ease of use, thereby encouraging greater AI adoption in daily banking operations.

This study has several limitations. First, the respondents were limited to commercial bank employees in Banyumas Raya, which may restrict the generalizability of the findings. Second, the cross-sectional design only reflects employees' perceptions at one point in time. Third, this study focused on the Technology Acceptance Model with AI Self-Efficacy as an external variable, while other potential determinants of AI adoption were not included.

Future research is recommended to involve respondents from broader geographical areas, apply longitudinal research designs, and incorporate additional variables such as organizational support, AI readiness, trust in AI, or social influence to provide a more comprehensive understanding of AI adoption behavior.

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