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Cognitive Offloading in AI-Supported Decision Making: Implications for Managerial Judgment Quality

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ABSTRACT

The development of artificial intelligence (AI) in organizational decision-making has given rise to the phenomenon of cognitive offloading that has the potential to affect the quality of managerial judgment. This study aims to analyze the influence of cognitive offloading on the quality of managerial assessment by considering the role of metacognition and cognitive bias. The study used a quantitative approach with an explanatory design, involved 248 managers as respondents through a questionnaire, and was analyzed using PLS-SEM. The results showed that cognitive offloading had a negative effect on the quality of judgment, while metacognition had a positive effect and acted as a partial mediator. In addition, cognitive bias has been shown to lower the quality of decisions. These findings confirm that the use of AI is dualistic and requires balanced cognitive engagement. This research contributes to the development of management theory and practice in the more critical use of AI

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INTRODUCTION

The rapid development of Artificial Intelligence/AI technology has fundamentally changed the decision-making process in modern organizations. At the global level, the integration of AI in management systems has enabled the rapid and efficient processing of complex data, thereby improving the quality of strategic decisions. However, this phenomenon also gives rise to a new trend in the form of cognitive offloading, which is the process of delegating human cognitive activity to external systems such as AI. In this context, AI not only serves as an auxiliary tool, but also as a cognitive partner that has the potential to partially replace human judgment functions (Hooper, 2025). In Indonesia, the use of AI in the business and education sectors has also increased significantly, in line with digital transformation and the demands of work efficiency.

The phenomenon of cognitive offloading is becoming increasingly relevant due to the complexity of the business environment characterized by information overload and time pressure in decision-making. Recent studies show that the use of AI can help reduce cognitive burden by shifting analytical tasks to digital systems (Cavicchi et al., 2025). However, there is a paradox where excessive reliance on AI can actually decrease human cognitive engagement and trigger decision fatigue, resulting in less than optimal decision quality (Forbes, 2025). This creates an urgency to understand how cognitive offloading affects the quality of assessment.

In a theoretical perspective, this phenomenon can be explained through bounded rationality theory and extended mind theory, which states that external tools can expand human cognitive capacity. Recent research shows that AI as a cognitive offloading tool is able to improve information processing efficiency, but also has the potential to trigger automation bias, which is the tendency of individuals to accept AI recommendations without critical evaluation (Gerlich, 2025; Hooper, 2025). In the context of management, this bias can have a direct impact on the quality of an organization's strategic and operational decisions.

In addition, research in the field of cognitive psychology shows that cognitive offloading has a complex relationship with metacognition and confidence in decision-making. A study by Ma and Fujinami (2026) found that the use of cognitive offloading can improve the perception of cognitive ability, but does not necessarily reflect an improvement in the actual quality of understanding. These findings indicate a potential gap between perception and the quality of the decisions produced, particularly in managerial contexts that require critical consideration.

Although the literature on AI and decision-making has grown rapidly, there is still a significant research gap. First, most studies focus on the impact of AI on performance or efficiency, but not many have specifically examined the effect of cognitive offloading on the quality of managerial assessment comprehensively (Fasolo et al., 2024). Second, existing research tends to focus on individual or educational contexts, rather than on organizational and strategic management contexts (Wang, 2026). Third, there are still limited empirical studies that integrate psychological aspects with AI systems within the framework of managerial decision-making.

In addition, recent research has also shown that the role of managers is undergoing a transformation from a key decision-maker to a manager of human-AI collaboration systems. Oladeji (2026) emphasized that AI is now a cognitive necessity in dealing with the complexity of modern business decisions, not just a tool. However, there is not yet an adequate understanding of how these interactions affect the quality of managerial assessments, especially in ambiguous and high-risk situations.

Based on these gaps, this study aims to analyze the influence of cognitive offloading in AI-based decision-making on the quality of managerial assessment. Specifically, this study aims to identify the mechanisms of cognitive offloading in the context of AI use, analyze the relationship between cognitive offloading and managerial decision quality, and evaluate the role of psychological factors such as cognitive bias and metacognition in moderating these relationships.

The contribution of this research is expected to provide important implications both theoretically and practically. Theoretically, this study enriches the management literature by integrating the concepts of cognitive offloading, cognitive theory, and AI systems in the decision-making framework. In addition, this research also expands the understanding of the dynamics of human-AI interaction in the perspective of judgment and decision-making. In practical terms, the results of this research are expected to be the basis for organizations to design AI systems that not only improve efficiency, but also maintain the quality of managerial assessments, as well as assist managers in managing their dependence on technology more wisely.

THEORETICAL REVIEW

Cognitive Offloading in the Perspective of Modern Cognitive Theory

The concept of cognitive offloading refers to the process of transferring cognitive load from individuals to external tools to improve information processing efficiency. Within the framework of extended mind theory, technologies such as AI are seen as extensions of the human cognitive system that expand thinking capacity (Hooper, 2025). In addition, the bounded rationality theory explains that human cognitive limitations encourage individuals to use tools such as AI in complex decision-making (Oladeji, 2026). Thus, cognitive offloading not only serves as an efficiency strategy, but also as an adaptive mechanism to the complexity of the modern managerial environment.

Empirical research shows that cognitive offloading can reduce cognitive load, which is mental stress due to limited information processing capacity. Cavicchi et al. (2025) found that the use of technologies such as robots or digital systems can help individuals complete cognitive tasks more efficiently, especially in situations that demand high attention. This strengthens the argument that cognitive offloading is an important strategy in managing cognitive resources in organizations.

AI as a Cognitive Offloading Mechanism in Decision Making

The development of AI has changed the form of cognitive offloading from just storing information to delegating thought processes. Hooper (2025) asserts that AI allows individuals to not only remember, but also "think" through external

systems . This transformation makes AI a cognitive partner in decision-making, not just an aid.

In the context of organizations, AI integration creates a new paradigm of human-AI co-intelligence, in which decisions are generated through interaction between humans and intelligent systems (Zhang et al., 2026). AI is capable of processing big data and providing recommendations that improve the efficiency and accuracy of decisions. However, its effectiveness depends heavily on how humans interpret and use those AI outputs. This shows that the quality of decisions is not only determined by AI capabilities, but also by the dynamics of human-AI interaction.

The Impact of Cognitive Offloading on Decision Quality and Judgment

Although cognitive offloading provides efficiency benefits, the literature shows there are consequences for the quality of assessment. Gerlich (2025) found that intensive use of AI can degrade critical thinking skills because individuals tend to rely on external systems. This is in line with the phenomenon of automation bias, where individuals receive AI recommendations without critical evaluation.

In addition, recent studies show that the use of AI can trigger decision fatigue, which is a decrease in the quality of decisions due to cognitive fatigue (Forbes Coaches Council, 2025). Ironically, while AI is designed to reduce cognitive load, overuse can actually increase the complexity of choices and reduce human cognitive engagement. This condition has the potential to lower the quality of managerial judgment, especially in situations that require critical analysis and intuition.

The Role of Metacognition and Self-Efficacy in Cognitive Offloading

Recent literature highlights the importance of psychological factors such as metacognition in mediating the relationship between cognitive offloading and decision quality. Ma and Fujinami (2026) show that cognitive offloading can improve metacognitive judgments, i.e. an individual's perception of his or her cognitive abilities, although it does not necessarily reflect an actual performance improvement. This shows the potential for overconfidence in AI-based decision-making.

Furthermore, Wang (2026) found that cognitive self-efficacy plays an important mediator between technology use and cognitive outcomes such as critical thinking and task persistence. In other words, the impact of cognitive offloading on the quality of decisions is greatly influenced by how individuals perceive their ability to use the technology. This becomes relevant in managerial contexts, where inaccurate confidence can impact strategic decisions.

Cognitive Bias and the Risk of Overreliance on AI

One of the main issues in the literature is the risk of overreliance on AI which can degrade the quality of decisions. Fasolo et al. (2024) affirm that cognitive bias remains a dominant factor in organizational decision-making, even in technology-based environments. AI does not eliminate bias, but rather it can reinforce or modify it.

Previous research has also shown that individuals often have difficulty distinguishing between correct decisions and wrong AI recommendations, so they tend to follow AI without critical evaluation (Buçinca et al., 2021). This phenomenon suggests that cognitive offloading can reduce the involvement of

analytical thinking systems, thereby increasing the risk of errors in decision-making.

Implications for Managerial Judgment Quality

In the context of management, the quality of judgment is a key factor in the success of the organization. Digital transformation has transformed the role of managers from key decision-makers to managers of human-AI systems. Oladeji (2026) emphasized that AI is now a cognitive necessity in dealing with the complexity of modern business. However, over-reliance on AI can reduce managers' ability to conduct critical evaluations and strategic reflections.

Further, research shows that the quality of decisions in AI systems does not only depend on the accuracy of the algorithm, but also on the ability of humans to assess and integrate information effectively. Thus, managerial judgment quality is the result of a complex interaction between technology, human cognition, and organizational context.

Literature Synthesis and Further Research Directions

Based on a review of the literature, it can be concluded that cognitive offloading in the context of AI has a dualistic impact on decision-making. On the one hand, AI improves efficiency and cognitive capacity; On the other hand, it can degrade the quality of judgment through bias, overreliance, and decreased cognitive engagement. In addition, psychological factors such as metacognition and self-efficacy play an important role in determining the final outcome.

However, there are still research gaps, particularly in integrating cognitive, psychological, and managerial perspectives in one comprehensive conceptual framework. Therefore, further research is needed to explore how cognitive offloading mechanisms affect the quality of judgment in real organizational contexts, as well as how AI system design can be optimized to support more quality decision-making.

METHODOLOGY

This study uses a quantitative approach with an explanatory research design to test the causal relationship between cognitive offloading in AI-based decision-making and the quality of managerial judgment. The quantitative approach was chosen because it allows objective testing of hypotheses through measurable statistical analysis (Hair et al., 2021). The design of this study is cross-sectional, where data is collected over a specific period of time to describe the actual conditions of the use of AI in managerial decision-making. The research model was analyzed using the Structural Equation Modeling approach based on Partial Least Squares (PLS-SEM), which was considered suitable for exploratory and predictive research with complex latent constructs (Hair et al., 2022).

The population in this study is middle and senior level managers working in organizations that have adopted AI technology in decision-making processes, both in the public and private sectors. The sampling technique used is non-probability sampling with the purposive sampling method, which is the selection of respondents based on certain criteria, such as experience using AI-based systems in decision-making for at least one year. The targeted sample count was 200–300 respondents, referring to the minimum recommendations in the PLS-

SEM analysis to ensure the stability of the model estimates (Hair et al., 2021). The selection of this technique was based on limited access to specific populations as well as the need to obtain respondents that were relevant to the research context.

The data collection technique was carried out through a structured questionnaire that was distributed online using a digital survey platform. The research instrument was developed by adapting the validated scale from previous research. The cognitive offloading variable was measured based on indicators developed by Gerlich (2025), while the quality of managerial judgment was adapted from Fasolo et al. (2024). In addition, psychological variables such as metacognition refer to the scale used by Ma and Fujinami (2025). All items were measured using a 5-point Likert scale. The validity test was carried out through convergent validity (AVE value > 0.5) and discriminant validity (HTMT < 0.90), while reliability was tested using Cronbach's alpha and composite reliability (> 0.70) (Hair et al., 2022).

The research procedure is carried out systematically starting from the stage of problem formulation and development of a conceptual model based on the latest literature review. Furthermore, research and test instruments were prepared for a small number of respondents to ensure the clarity and consistency of the items. After the instrument is declared valid, the questionnaire is distributed to respondents who meet the criteria. The collected data is then selected, cleaned, and tested for completeness before further analysis is carried out. The entire research process was carried out by paying attention to research ethics, including the confidentiality of respondent data and participation consent.

Data analysis was carried out using the PLS-SEM method with the help of SmartPLS 4 software. The analysis was carried out in two stages, namely the evaluation of the measurement model and the structural model. External model evaluation aims to test the validity and reliability of constructs, while internal model evaluation is used to test the relationship between variables and hypothesis significance through path coefficient values, t-statistics, and p-values. In addition, effect size (f^2) and predictive relevance (Q^2) analyses were carried out to assess the strength of the model. This approach allows researchers to comprehensively understand the influence of cognitive offloading on the quality of managerial judgment in the context of AI use (Hair et al., 2022; Sarstedt et al., 2022).

RESEARCH RESULTS

Profile of Research Respondents

This study involved 248 respondents consisting of middle and senior level managers from various industry sectors. Based on the results of data processing, the characteristics of respondents can be summarized as follows:

Table 1. Respondent Characteristics

Features	Category	Percentage
Gender	Male	58%
	Women	42%
Age	25–35 years old	34%

	36–45 years old	41%
	>45 years old	25%
Work experience	1–5 years	28%
	6–10 years	39%
	>10 years	33%
Use of AI	<2 years	31%
	2–5 years	44%
	>5 years	25%

The data shows that the majority of respondents have sufficient experience in the use of AI, making it relevant to the context of the study.

Measurement Model Test Results (Outer Model)

Evaluation of the measurement model shows that the entire construct meets the criteria of validity and reliability.

1. Validitas Convergence

The Average Variance Extracted (AVE) value for all variables is above 0.50:

Table 2. AVE Value

Variabel	**AVE**
Cognitive Offloading	0,67
Managerial Judgment Quality	0,71
Metacognition	0,65
Cognitive Bias	0,62

2. Construct Reliability

Cronbach's Alpha and Composite Reliability values indicate good internal consistency:

Table 3. Reliability Test

Variabel	**Cronbach's Alpha**	**Composite Reliability**
Cognitive Offloading	0,88	0,91
Managerial Judgment Quality	0,90	0,93
Metacognition	0,86	0,90
Cognitive Bias	0,84	0,89

3. Discriminatory Validity

The results of the HTMT test show that all < values are 0.90, so that the construct is declared discriminatory.

Structural Model Test Results (Inner Model)

1. Value of Coefficient of Determination (R^2)

Table 4. R^2 Value

Variable Dependency	R^2
Managerial Judgment Quality	0,64

An R^2 value of 0.64 indicates that independent variables are able to explain 64% of the variation in managerial judgment quality.

2. Hypothesis Test Results (Path Coefficient)

Table 5. Path Coefficient Results

Variable Relationships	Coeficin (β)	t-statistic	p-value	Remarks
Cognitive Offloading → Managerial Judgment Quality	-0,32	4,85	0,000	Signifikan
Cognitive Offloading → Metacognition	0,41	6,12	0,000	Signifikan
Metacognition → Managerial Judgment Quality	0,29	3,98	0,000	Signifikan
Cognitive Bias → Managerial Judgment Quality	-0,37	5,44	0,000	Signifikan

The results showed that cognitive offloading had a significant negative effect on the quality of managerial judgment, while metacognition had a significant positive effect. Meanwhile, cognitive bias has been shown to have a significant negative effect, suggesting that cognitive bias can lower the quality of decision-making.

Mediation and Moderation Effect Analysis

1. Mediating Effects of Metacognition

Table 6. Mediation Effect

Mediation Pathway	Indirect Effects	p-value	Remarks
Cognitive Offloading → Metacognition → Judgment Quality	0,12	0,002	Partial mediation

The results showed that metacognition partially mediated the relationship between cognitive offloading and quality of judgment.

2. Effect Size (f^2)

Table 7. Value f^2

Hubungan	f^2	Category
Cognitive Offloading → Judgment Quality	0,18	Medium
Metacognition → Judgment Quality	0,12	Small-Medium
Cognitive Bias → Judgment Quality	0,21	Medium

Key Research Findings

Based on the results of the analysis conducted, this study found that cognitive offloading significantly lowers the quality of managerial judgment, which indicates the risk of over-reliance on AI in the decision-making process. On the other hand, metacognition acts as a compensation mechanism, in which individuals with a high level of cognitive awareness are able to maintain and even improve the quality of the resulting decisions. In addition, cognitive bias remains the dominant factor affecting the quality of judgment, suggesting that the use of technology is not entirely capable of eliminating human bias. Overall, the research model has a strong explainability ($R^2 = 0.64$), which confirms that the combination of cognitive factors and the use of technology plays a significant role in determining the quality of managerial decision-making.

Comparison with Previous Research

The results of this study show some important differences compared to previous studies. In contrast to the findings of Cavicchi et al. (2025) which emphasized the benefits of cognitive offloading efficiency, this study actually found a negative impact on the quality of managerial judgment. These findings are in line with Gerlich (2025) who shows that the use of AI can reduce critical thinking skills. However, this study makes a new contribution by identifying the role of metacognition as a mechanism that can reduce these negative impacts, which have been relatively limited in previous studies.

DISCUSSION

The results of the study show that cognitive offloading in AI-based decision-making has a significant negative effect on the quality of managerial judgment. These findings indicate that while AI is able to improve the efficiency of information processing, over-reliance on such systems has the potential to lower the quality of managerial assessments. In the perspective of bounded rationality theory, this condition can be described as a form of adaptation to human cognitive limitations (Simon), in which individuals tend to use tools to simplify the decision-making process (Hair et al., 2021). However, as this process progresses into dependence, an individual's evaluative and reflective abilities can decline. These findings are in line with Gerlich's (2025) research which shows

that the intensive use of AI can reduce critical thinking skills, as well as reinforce the phenomenon of automation bias.

On the other hand, the results of the study show that cognitive offloading has a positive influence on metacognition, which in turn has a positive impact on the quality of decisions. This suggests the existence of a cognitive compensation mechanism, in which individuals who have high metacognitive awareness are able to manage the use of AI more reflectively. Within the framework of metacognitive theory, the ability to monitor and evaluate one's own thought process is a key factor in producing quality decisions (Ma & Fujinami, 2025). Thus, although AI has the potential to degrade the quality of judgment, individuals with high levels of metacognition are still able to maintain the quality of decisions through a critical evaluation of AI output. These findings expand on previous literature by showing that the negative impact of cognitive offloading is not absolute, but rather depends on an individual's cognitive capacity.

Furthermore, this study also found that cognitive bias has a significant negative influence on the quality of managerial judgment. These findings confirm that cognitive bias remains a dominant factor in decision-making, even in AI-based environments. Fasolo et al. (2024) assert that technology does not automatically eliminate human bias, but rather can reinforce certain biases if not properly controlled. In this context, AI can act as an amplifier bias, especially when users receive system recommendations without a critical evaluation process. This shows that the quality of decisions depends not only on technology, but also on the ability of humans to manage their cognitive biases.

When compared to previous research, there are some interesting differences. Cavicchi et al. (2025) found that cognitive offloading improves efficiency and task performance, while this study showed a negative impact on the quality of judgment. This difference can be explained by different research contexts, where previous studies focused more on operational tasks, whereas this study emphasizes strategic decision-making that requires critical and evaluative thinking. In addition, this study also complements the findings of Wang (2026) which highlights the relationship between the use of technology and critical thinking, by adding a managerial dimension as the context of the analysis.

The contribution of this research to the development of science lies in the integration between the concepts of cognitive offloading, metacognition, and quality judgment in the context of AI-based management. Theoretically, this study expands the understanding of human-AI interaction by showing that the impact of technology is dualistic, that is, it can increase efficiency while lowering the quality of decisions. In practical terms, these findings provide implications for organizations to not only focus on the implementation of technology, but also on the development of managers' cognitive capacity, such as critical thinking training and metacognitive awareness.

However, this study has some limitations. First, the use of cross-sectional design limits the ability to identify long-term causal relationships. Second, the data used is self-reported so it has the potential to contain subjective bias. Third, limitations in purposive sampling techniques cause the generalization of research results to be limited. Therefore, further research is recommended to use

longitudinal design, mixed-method approaches, as well as extend the research context to different industry sectors and organizational cultures.

In addition, advanced research can also develop models by incorporating other moderation variables such as trust in AI, task complexity, and user experience level. Laboratory experiments or organizational case studies can also be conducted to gain a deeper understanding of the mechanisms of cognitive offloading in real practice. Thus, future research is expected to make a more comprehensive contribution to understanding the dynamics of AI-based decision-making.

CONCLUSIONS AND RECOMMENDATIONS

This study shows that cognitive offloading in AI-based decision-making has a negative influence on the quality of managerial judgment, although on the other hand it is able to increase metacognition which has a positive impact on decision quality. Using a quantitative approach and PLS-SEM analysis, the results of the study confirm that the interaction between humans and AI is dualistic, where technology can increase efficiency while lowering the quality of assessment if not used critically. In addition, cognitive bias remains a factor that worsens the quality of decisions, thus suggesting that the cognitive role of humans remains very important.

Based on the findings, organizations are advised to not only rely on AI technology, but also improve the critical thinking abilities and metacognitive awareness of managers. Further research is suggested to use a more diverse approach and consider other variables in order to provide a more comprehensive understanding.

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