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HUMAN–AI COLLABORATION AND MANAGERIAL DECISION-MAKING A FRAMEWORK FOR AI-ASSISTED INFORMATION SYSTEMS

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ABSTRACT

The rapid adoption of Artificial Intelligence (AI) in organizational information systems is significantly transforming the nature of managerial decision-making. AI-assisted information systems can process large and complex datasets, identify hidden patterns, generate predictions, and provide recommendations that support managers in strategic and operational decisions. However, the effectiveness of AI-supported decision-making depends not only on technological capability but also on how managers understand, trust, evaluate, and collaborate with AI-generated recommendations. Excessive reliance on AI may lead to automation bias, while insufficient trust may result in the rejection of valuable AI insights. In this context, the present study proposes an integrated framework for examining Human–AI collaboration in managerial decision-making. The framework establishes relationships among AI capability, AI explainability, human trust in AI, Human–AI partnership, decision quality, and organizational outcomes. AI capability represents the analytical and predictive strength of AI systems, while explainability enables managers to understand and evaluate AI-generated recommendations. Human trust is positioned as a key mechanism through which technological capabilities influence effective Human–AI collaboration. The framework further emphasizes human oversight and organizational AI readiness to ensure appropriate managerial control and responsible use of AI. The proposed model suggests that effective collaboration between human expertise and AI intelligence can enhance decision accuracy, timeliness, strategic alignment, and overall organizational performance. The study provides a structured foundation for empirically examining AI-assisted managerial decision-making and offers practical implications for organizations seeking to implement AI as a collaborative decision-support capability rather than a replacement for managerial judgment.

Keywords: Artificial Intelligence, Human–AI Collaboration, Managerial Decision-Making, AI-Assisted Information Systems, AI Capability, Explainable AI, Trust In AI, Human Oversight, Decision Quality, Organizational Performance

1 INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has fundamentally changed the way organizations collect, process, interpret, and use information for managerial decision-making. Traditional information systems primarily supported managers by providing structured data, reports, and analytical summaries, whereas modern AI-assisted information systems can process large volumes of complex data, identify patterns, predict future outcomes, generate recommendations, and support real-time decision-making. The integration of AI into organizational processes has therefore created new opportunities for improving managerial efficiency, decision accuracy, and strategic

responsiveness. However, the increasing availability of AI does not necessarily ensure better decisions. The value of AI depends on how effectively managers understand, evaluate, and collaborate with AI-generated information and recommendations.

Managerial decision-making involves uncertainty, incomplete information, organizational constraints, and contextual considerations that cannot always be captured through historical data. AI systems are highly effective in computational tasks such as pattern recognition, prediction, classification, optimization, and large-scale information processing. Managers, in contrast, contribute domain expertise, experience, contextual understanding, ethical judgment, creativity, and accountability. This difference suggests that AI and managers possess complementary capabilities rather than identical decision-making strengths. Consequently, Human–AI collaboration has emerged as an important approach in which AI provides analytical intelligence while managers retain responsibility for interpretation, judgment, and final decision authority.

Despite the potential benefits, organizations face several challenges when integrating AI into managerial decision processes. One of the major challenges is the level of trust managers place in AI recommendations. Excessive trust may cause managers to accept incorrect or inappropriate AI outputs without sufficient verification, resulting in automation bias. On the other hand, inadequate trust may cause managers to reject useful AI recommendations, limiting the potential benefits of AI-assisted systems. Therefore, effective AI-supported decision-making requires appropriately calibrated trust rather than simply increasing managers' confidence in AI.

AI explainability is another important factor influencing managerial interaction with AI systems. Managers are more likely to evaluate and appropriately use AI recommendations when they can understand the basis of those recommendations. Explainable AI can improve transparency and provide managers with greater insight into the factors influencing an AI-generated decision. However, explanations must be understandable and relevant to the decision context; excessive technical information may increase cognitive burden rather than improve decision-making. Thus, explainability should support managerial understanding and critical evaluation rather than merely increase acceptance of AI outputs.

The effectiveness of Human–AI collaboration also depends on the organization's readiness to integrate AI into existing managerial processes. Organizational AI readiness includes appropriate technological infrastructure, employee skills, leadership support, governance mechanisms, data availability, and policies for responsible AI use. In addition, human oversight is essential, particularly when AI is used for high-impact managerial decisions. Managers should retain the ability to verify, question, modify, or reject AI recommendations when contextual knowledge indicates that an alternative decision is more appropriate.

Based on these considerations, this study proposes an integrated framework linking AI capability, AI explainability, human trust, Human–AI collaboration, decision quality, and organizational outcomes. The framework considers human trust as an important mechanism through which AI system characteristics influence collaborative decision-making. Human–AI collaboration is positioned as a central process through which AI capabilities and managerial expertise are combined to improve decision quality. Improved decision quality is subsequently expected to contribute to organizational outcomes such as operational efficiency, innovation, strategic effectiveness, and overall organizational performance.

The study therefore shifts the focus from AI as a replacement for managerial intelligence toward AI as a collaborative decision-support capability. The proposed framework provides a foundation for examining how organizations can develop effective, explainable, trustworthy, and human-centered AI-assisted information systems that enhance managerial judgment while maintaining appropriate human control and accountability.

2 LITERATURE REVIEW

Artificial Intelligence (AI) is increasingly being integrated into organizational information systems to support managerial decision-making through data analysis, prediction, and intelligent recommendations. Human–AI collaboration enables organizations to combine the analytical capabilities of AI with human expertise, experience, and contextual judgment [1,2]. Studies indicate that such collaboration can improve decision efficiency and support managers in handling complex information [3].

AI capability is an important factor in effective decision support because advanced systems can process large datasets and identify patterns that may not be easily recognized by managers [4]. However, AI-generated outputs may not always reflect organizational context, making managerial interpretation and judgment essential [5]. Therefore, AI is more effective when used as a complementary capability rather than as a complete replacement for human decision-makers [6].

Trust is another critical factor in AI-assisted decision-making. Appropriate trust encourages managers to use AI recommendations, while excessive trust can create automation bias and insufficient trust can result in algorithmic aversion [7,8]. Explainable AI can support appropriate trust by helping managers understand the basis of AI recommendations. However, explanations need to be clear and relevant because overly complex explanations may increase cognitive burden [9,10].

Human oversight is essential for maintaining managerial control and accountability. Managers should be able to verify, modify, or reject AI recommendations when contextual or ethical considerations require intervention [11]. Organizational AI readiness, including technological infrastructure, employee skills, leadership support, and governance, also influences successful AI adoption [12,13].

Research further suggests that effective Human–AI collaboration can improve decision quality through complementary human and machine capabilities [14]. Improved decision quality can subsequently contribute to organizational efficiency, innovation, and overall performance [15]. However, an integrated framework connecting AI capability, explainability, trust, Human–AI collaboration, decision quality, and organizational outcomes remains important. Therefore, this study proposes a framework in which AI capability and explainability influence human trust, trust facilitates Human–AI collaboration, and collaboration improves managerial decision quality and organizational outcomes, supported by appropriate human oversight and organizational readiness.

2.1 Research Gap

Although previous studies have examined AI adoption, trust, explainability, and Human–AI collaboration, limited research integrates these factors into a single framework for managerial decision-making. Existing research often focuses on technological performance or user acceptance, while the combined influence of AI capability, explainability, human trust, and collaborative decision-making remains less explored. Furthermore, the role of human oversight and organizational readiness in ensuring effective AI-supported decisions requires greater attention.

There is also limited understanding of how Human–AI collaboration converts AI capabilities into improved managerial decision quality and organizational outcomes. Therefore, this study addresses the gap by proposing an integrated framework linking AI Capability + AI Explainability, Human Trust, Human–AI Collaboration, Decision Quality, Organizational Outcomes, supported by human oversight and organizational AI readiness.

Research Objectives

The main objective of this study is to develop a framework for understanding how Human–AI collaboration can improve managerial decision-making in AI-assisted information systems. The specific objectives are:

- To examine the influence of AI capability on managerial decision-making.
- To examine the role of AI explainability in developing trust in AI.
- To analyze the influence of human trust on Human–AI collaboration.
- To determine the effect of Human–AI collaboration on managerial decision quality.
- To examine the relationship between decision quality and organizational outcomes.
- To highlight the importance of human oversight and organizational AI readiness in effective AI-assisted decision-making.

2.2 Research Questions

The study addresses the following research questions:

- **RQ1:** How does AI capability influence managerial decision-making?
- **RQ2:** How does AI explainability influence managers' trust in AI?
- **RQ3:** How does trust in AI influence Human–AI collaboration?
- **RQ4:** Does Human–AI collaboration improve managerial decision quality?
- **RQ5:** How does improved decision quality contribute to organizational outcomes?
- **RQ6:** What role do human oversight and organizational AI readiness play in effective Human–AI collaboration?

3 PROPOSED CONCEPTUAL FRAMEWORK

The proposed conceptual framework explains how AI-assisted information systems can improve managerial decision-making through effective collaboration between artificial intelligence and human expertise. The framework is based on the assumption that AI should complement managerial capabilities rather than completely replace human judgment. It

integrates technological, behavioral, collaborative, and organizational factors to explain the pathway from AI adoption to improved decision outcomes.

AI Capability represents the ability of an AI system to analyze large volumes of data, identify patterns, generate predictions, evaluate alternatives, and provide relevant recommendations. Higher AI capability can provide managers with faster and more comprehensive analytical support. However, AI-generated outputs may not always capture organizational context or strategic considerations. Therefore, AI capability is expected to contribute to better managerial decisions when combined with human evaluation.

AI Explainability represents the extent to which managers can understand the reasoning, factors, or evidence behind AI-generated recommendations. Explainable AI can improve transparency and help managers assess whether a recommendation is appropriate for a particular situation. When managers understand how an AI system reaches its recommendations, they can more effectively verify and incorporate those recommendations into their decision processes.

Human Trust in AI acts as an important behavioral mechanism in the proposed framework. Managers need an appropriate level of confidence in AI recommendations to use them effectively. Excessive trust may lead to unquestioning acceptance of AI outputs, while insufficient trust may result in rejection of useful recommendations. Therefore, calibrated trust is considered essential for effective AI-assisted managerial decision-making.

Human–AI Collaboration represents the process through which managers and AI systems jointly contribute to decision-making. AI provides computational power, data analysis, predictions, and recommendations, while managers contribute experience, contextual understanding, creativity, ethical reasoning, and strategic judgment. Effective collaboration is therefore expected to produce better decisions than relying exclusively on either AI or human judgment.

Decision Quality represents the quality of managerial decisions produced through the collaborative process. It can be reflected through decision accuracy, timeliness, consistency, relevance, and alignment with organizational objectives. Effective Human–AI collaboration is expected to improve decision quality by combining the analytical capabilities of AI with the contextual capabilities of managers.

Organizational Outcomes represent the broader benefits resulting from improved managerial decisions. These may include operational efficiency, improved resource allocation, innovation, productivity, strategic effectiveness, and overall organizational performance. Thus, decision quality serves as an important link between Human–AI collaboration and organizational outcomes.

Human Oversight is incorporated as a supporting factor to ensure that managers retain control over AI-assisted decisions. Managers should have the ability to verify, modify, question, or reject AI recommendations when required. This reduces the risk of inappropriate automation and maintains accountability for important organizational decisions.

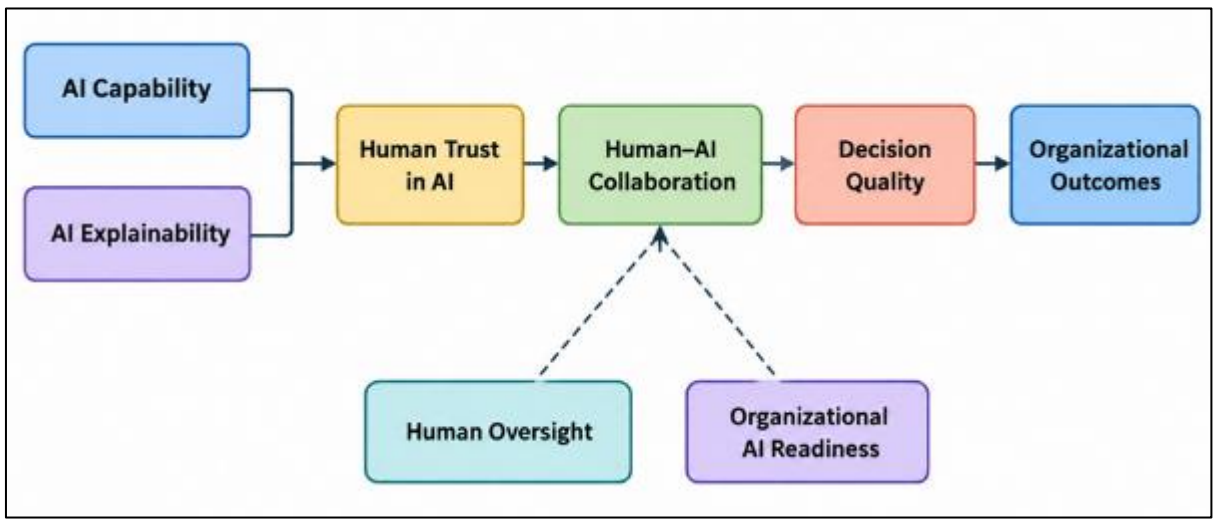

Figure 1: Proposed Human–AI Collaboration Framework

Organizational AI Readiness represents the organization's preparedness to implement and use AI effectively. It includes technological infrastructure, employee skills, leadership support, data availability, organizational culture, and

appropriate AI governance. A higher level of AI readiness can facilitate effective Human–AI collaboration and increase the likelihood of achieving positive organizational outcomes.

The framework proposes that AI capability and explainability strengthen human trust, trust facilitates effective Human–AI collaboration, and collaboration improves managerial decision quality, which ultimately contributes to organizational outcomes. Human oversight and organizational AI readiness provide the necessary conditions for ensuring that this collaboration remains effective, responsible, and aligned with organizational objectives.

4 RESEARCH METHODOLOGY

4.1 Research Design

The study adopts a quantitative, cross-sectional research design to empirically examine the proposed Human–AI collaboration framework. The study focuses on understanding how AI capability and AI explainability influence managerial trust, how trust facilitates Human–AI collaboration, and how collaboration contributes to decision quality and organizational outcomes.

4.2 Target Population

The target population comprises managers, executives, department heads, business analysts, IT professionals, and other organizational decision-makers who use or interact with AI-assisted information systems. Participants should have sufficient exposure to AI-based tools such as predictive analytics, intelligent decision-support systems, generative AI, recommendation systems, or AI-enabled business applications.

4.3 Sampling Technique and Sample Size

A purposive sampling technique will be employed because the study requires respondents with practical experience of AI-assisted decision-making. A target sample of approximately 300–500 respondents is proposed to provide adequate observations for structural equation modeling. The final sample size can be determined using statistical power analysis based on the number of constructs and relationships in the proposed model.

4.4 Data Collection

Primary data will be collected through a structured questionnaire distributed electronically and, where appropriate, through direct organizational contact. The questionnaire will begin with a brief explanation of the study and instructions for respondents. Participation will be voluntary, and responses will be collected anonymously.

A five-point Likert scale will be used for the major measurement items:

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.

4.5 Research Constructs

The study consists of eight major constructs. AI Capability measures the analytical, predictive, learning, and recommendation capabilities of AI systems. AI Explainability evaluates the extent to which managers can understand and interpret AI-generated recommendations. Human Trust in AI measures managers' confidence in the reliability and competence of AI systems.

Human–AI Collaboration measures the extent to which managers and AI systems jointly contribute to decision-making. Decision Quality evaluates the accuracy, timeliness, consistency, relevance, and strategic usefulness of managerial decisions. Human Oversight measures the ability of managers to verify, intervene in, modify, or override AI recommendations.

Organizational AI Readiness evaluates organizational infrastructure, employee capabilities, leadership support, governance, and preparedness for AI implementation. Finally, Organizational Outcomes measure improvements in efficiency, productivity, innovation, strategic performance, and overall organizational effectiveness.

4.6 Questionnaire Development

Measurement items will be adapted from established literature on AI adoption, explainable AI, trust in AI, human–AI collaboration, decision support, and organizational readiness. The questionnaire will be reviewed for clarity and relevance before the main data collection.

A small pilot study may be conducted before the final survey to identify ambiguous questions, assess initial reliability, and ensure that the questionnaire is understandable to the target respondents. Necessary modifications will be made based on the pilot results.

4.7 Data Analysis

The collected data will initially be examined using descriptive statistics to summarize respondent characteristics and the distribution of the study variables. Mean, standard deviation, frequency, and percentage will be used where appropriate.

The proposed conceptual model will then be tested using Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM is appropriate for examining complex relationships involving multiple constructs, mediation effects, and supporting factors.

The analysis will be conducted in two major stages:

Measurement Model → Structural Model

The measurement model will assess whether the questionnaire items reliably and validly measure their respective constructs. Factor loadings, Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) will be used to assess reliability and convergent validity. Discriminant validity will be evaluated using the Heterotrait–Monotrait (HTMT) ratio.

The structural model will subsequently examine the proposed relationships among the constructs. Path coefficients, t-values, p-values, confidence intervals, coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2) can be assessed to determine the explanatory and predictive strength of the model.

4.8 Mediation Analysis

The framework proposes Human Trust in AI as a mediating variable between AI-related characteristics and Human–AI collaboration. Mediation analysis will determine whether AI capability and AI explainability influence collaboration indirectly through human trust.

- AI Capability → Human Trust → Human–AI Collaboration
- AI Explainability → Human Trust → Human–AI Collaboration
- Human–AI collaboration will also be examined as a mediator between trust and decision quality:
- Human Trust → Human–AI Collaboration → Decision Quality
- Bootstrapping procedures can be used to determine the significance of these indirect effects.

4.9 Role of Human Oversight and Organizational AI Readiness

Human oversight and organizational AI readiness will be incorporated as supporting variables in the proposed framework. Human oversight is expected to ensure that AI recommendations remain subject to managerial evaluation and control. Organizational AI readiness is expected to strengthen the organization's ability to integrate AI effectively into managerial processes.

These variables can be tested either as moderating variables or as supporting predictors, depending on the final research model and empirical results.

4.10 Ethical Considerations

Participation in the study will be voluntary. Respondents will be informed about the purpose of the research, and their responses will be treated confidentially. No personally identifiable information will be unnecessarily collected. The collected data will be used exclusively for academic and research purposes.

4.11 Methodological Flow

Overall, the methodology provides a systematic approach for empirically validating the proposed framework and determining whether AI capability and explainability enhance trust, trust promotes Human–AI collaboration, and collaboration improves managerial decision quality and organizational outcomes.

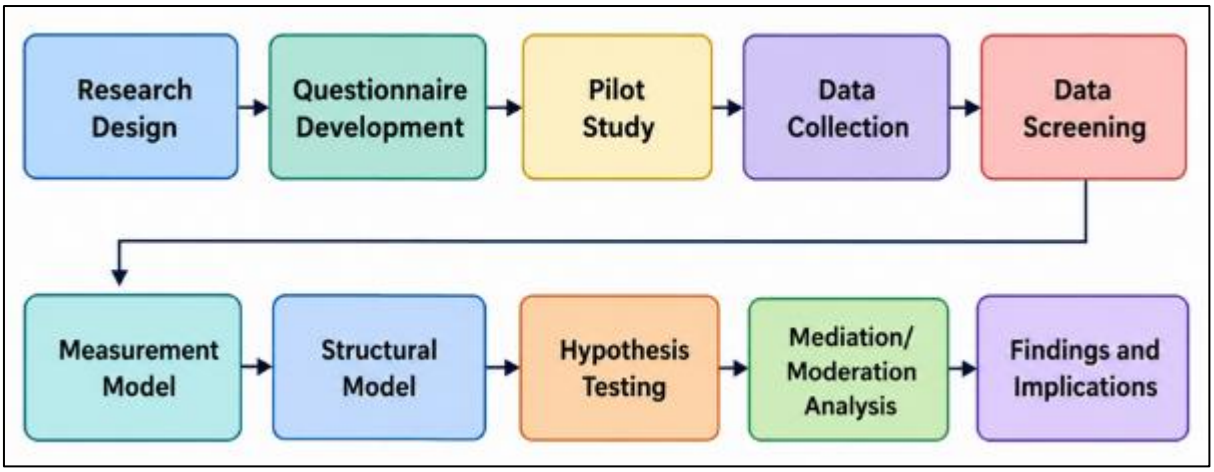

Figure 2: Methodology flow chart

5 EXPECTED RESULTS

The proposed framework is expected to demonstrate a significant relationship between AI-enabled capabilities and managerial decision-making. AI capability is expected to positively influence managers' trust in AI because systems with stronger analytical, predictive, and recommendation capabilities can provide more useful decision support. Similarly, AI explainability is expected to strengthen trust by enabling managers to understand and evaluate AI-generated recommendations.

The results are expected to show that human trust acts as a key link between AI system characteristics and Human–AI collaboration. Managers who appropriately trust AI are expected to interact more actively with AI recommendations, while retaining their own professional judgment. This indicates that effective AI adoption depends on calibrated trust rather than complete dependence on AI.

A strong positive relationship is expected between Human–AI collaboration and decision quality. AI can provide rapid data analysis, prediction, pattern identification, and alternative recommendations, whereas managers can contribute contextual knowledge, experience, strategic reasoning, and ethical judgment. Their combination is expected to produce decisions that are more accurate, timely, relevant, and consistent.

The study is also expected to establish that decision quality positively contributes to organizational outcomes. Better managerial decisions can improve resource utilization, operational efficiency, productivity, innovation, risk management, and strategic performance. Thus, organizational benefits from AI are expected to occur indirectly through improvements in managerial decision quality.

The proposed mediation relationships are particularly important. Human trust is expected to mediate the relationship between AI capability, AI explainability, and Human–AI collaboration, while Human–AI collaboration is expected to mediate the relationship between trust and decision quality. This indicates that technological improvements alone may not produce better managerial outcomes unless managers develop appropriate trust and actively collaborate with AI.

Human oversight is expected to have a positive supporting role by ensuring that AI recommendations are reviewed before important decisions are implemented. Similarly, organizational AI readiness is expected to strengthen the effectiveness of Human–AI collaboration through appropriate infrastructure, employee capabilities, leadership support, and AI governance.

5.1 Expected Relationship of Variables

Overall, the expected findings indicate that Human–AI collaboration is the central mechanism through which AI capabilities are converted into better managerial decisions. The framework therefore suggests that organizations should not evaluate AI success only through system accuracy or automation levels. Instead, success should be evaluated through the quality of collaboration between AI systems and managers, the quality of resulting decisions, and the organizational value generated from those decisions.

Table 1: Expected Relationship of Variables

Relationship	Expected Result
AI Capability → Human Trust	Positive
AI Explainability → Human Trust	Positive
Human Trust → Human–AI Collaboration	Positive
Human–AI Collaboration → Decision Quality	Strong Positive
Decision Quality → Organizational Outcomes	Positive
Human Trust → Collaboration → Decision Quality	Positive Mediation
AI Capability → Trust → Collaboration	Positive Mediation
AI Explainability → Trust → Collaboration	Positive Mediation
Human Oversight → Collaboration	Positive Supporting Effect
Organizational AI Readiness → Collaboration	Positive Supporting Effect

6 DISCUSSION

The proposed framework indicates that AI capability and AI explainability are important factors in developing managerial trust in AI-assisted information systems. While AI capability enables rapid data processing, prediction, and recommendation, explainability allows managers to understand and evaluate AI-generated outputs. Together, these factors are expected to promote appropriate trust and encourage managers to use AI effectively in decision-making.

Human trust acts as an important mechanism between AI capabilities and Human–AI collaboration. Effective collaboration occurs when managers use AI-generated insights while continuing to apply their own knowledge, experience, contextual understanding, and professional judgment. This balanced relationship can reduce both excessive dependence on AI and unnecessary rejection of useful AI recommendations. The framework further proposes that Human–AI collaboration improves managerial decision quality by combining the computational strengths of AI with human decision-making capabilities. AI can support managers in identifying patterns, comparing alternatives, and processing large volumes of information, while managers remain responsible for interpreting results and making final decisions. Improved decision quality is subsequently expected to contribute to better organizational outcomes such as efficiency, productivity, innovation, and strategic performance.

Human oversight and organizational AI readiness provide additional support for successful collaboration. Human oversight ensures that managers can verify, modify, or reject AI recommendations when required, while organizational readiness ensures the availability of appropriate infrastructure, skills, leadership support, data, and governance mechanisms. Therefore, the framework emphasizes that successful AI adoption depends not only on technological capability but also on managerial involvement and organizational preparedness.

6.1 Theoretical Implications

The framework contributes to AI and information-systems research by integrating technological, behavioral, and organizational factors into a single model of managerial decision-making. It explains how AI capabilities can generate organizational value through trust and Human–AI collaboration rather than through automation alone.

6.2 Managerial Implications

Organizations should invest in explainable AI systems, employee AI literacy, human oversight, and appropriate AI governance. Managers should be encouraged to critically evaluate AI recommendations and combine them with their own expertise. Such an approach can support responsible AI adoption and improve the quality and effectiveness of managerial decisions.

7 CONCLUSION

The study proposed an integrated framework for understanding Human–AI collaboration in managerial decision-making. The framework establishes a sequential relationship in which AI capability and AI explainability influence human trust, trust facilitates Human–AI collaboration, and effective collaboration improves managerial decision quality and organizational outcomes. The framework highlights that AI should function as a decision-support and augmentation

capability rather than a replacement for managerial judgment. Human oversight and organizational AI readiness further strengthen the effective and responsible use of AI-assisted information systems. The proposed model provides a foundation for future empirical research using survey data and PLS-SEM to validate the relationships among AI capability, explainability, trust, collaboration, decision quality, and organizational outcomes.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare no conflicts of interest regarding this manuscript

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