

REVIEWER'S REPORT

Manuscript No.: IJAR-59221

Title: Artificial Intelligence-Assisted Decision Systems for Brokerage Operations and Capital Market Risk Management in Saudi Arabia

Recommendation:

Accept as it is

Accept after minor revision.....

Accept after major revision

Do not accept (*Reasons below*)

Rating	Excel.	Good	Fair	Poor
Originality		✓		
Techn. Quality		✓		
Clarity		✓		
Significance	✓			

Reviewer's ID: JPR-002

Detailed Reviewer's Report

Overall Assessment

The manuscript, "Artificial Intelligence-Assisted Decision Systems for Brokerage Operations and Capital Market Risk Management in Saudi Arabia," addresses a timely and relevant topic at the intersection of artificial intelligence, brokerage operations, capital-market risk management, and the Saudi financial market. The manuscript adopts an integrative review approach and attempts to move beyond prediction accuracy toward a broader decision-system perspective incorporating risk controls, explainability, validation, human oversight, and auditability. The proposed architecture and Saudi-specific research agenda provide practical relevance.

1. Originality and Contribution

The manuscript presents a useful system-level perspective by positioning AI not merely as a prediction tool but as part of a governed decision architecture. The integration of predictive analytics, risk constraints, explainability, validation, human escalation, and auditability is relevant to brokerage operations. The focus on Saudi Arabia and Tadawul also provides contextual value. However, the authors should articulate more explicitly what is conceptually new in the proposed architecture compared with existing AI governance, financial-risk, and algorithmic-trading frameworks. The specific contribution of the proposed architecture should be clearly distinguished from the synthesis of existing practices.

2. Abstract and Presentation of the Study

The abstract is well structured and clearly communicates the research context, methodology, major findings, and proposed direction. It appropriately highlights the distinction between predictive gains and

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actual economic or regulatory outcomes. The conclusion regarding controlled augmentation is also consistent with the manuscript's overall argument. However, the abstract could be strengthened by stating more explicitly the research gap addressed by the review and the precise contribution of the proposed decision architecture.

3. Introduction and Research Context

The introduction provides a strong rationale for examining AI in brokerage and capital-market activities. The manuscript appropriately identifies non-stationarity, data snooping, changing market microstructure, and the difference between prediction and deployable economic value. The shift from asking which model predicts best to examining the organizational and market conditions under which AI can improve decisions is a useful framing. Nevertheless, the theoretical or conceptual gap could be stated more sharply so that readers can immediately understand why an additional decision architecture is required.

4. Literature Review and Critical Synthesis

The literature review covers several relevant areas, including forecasting, algorithmic trading, portfolio management, market-risk measurement, explainable AI, governance, data architecture, and operational resilience. A positive feature is that the review does not simply emphasize successful AI applications; it also recognizes model instability, transaction costs, data leakage, tail-risk problems, and governance challenges. The discussion of contradictory evidence, particularly between neural models and conventional GARCH-based approaches, adds balance. The authors could further strengthen the review by making the theoretical relationships between these streams more explicit and identifying where the existing literature remains fragmented.

5. Review Methodology

The structured integrative review methodology is appropriate for a multidisciplinary topic. The manuscript clearly identifies the principal databases, search terms, publication period, inclusion and exclusion criteria, screening approach, quality assessment criteria, and thematic coding procedure. The authors also explicitly state that they did not fabricate screening counts, which is methodologically responsible. However, reproducibility could be improved by providing a concise search-strategy table containing database names, search strings, dates of searches, and the number of records initially identified and finally included, where such records are available.

6. Proposed AI-Assisted Brokerage Decision Architecture

The proposed architecture is one of the manuscript's important contributions. The layered approach distinguishes between model outputs, optimization/business rules, risk controls, and human governance. This provides a logical framework for understanding how AI outputs can be incorporated into regulated brokerage decisions. The manuscript should, however, explain more explicitly which elements are newly

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proposed by the authors and which are adapted or synthesized from previous literature. A clearer mapping between each architectural component and the literature evidence supporting it would further strengthen the conceptual contribution.

7. Tables, Figures, and Operational Framework

The analytical domains table and governance-control table provide useful structure. The governance table particularly helps connect lifecycle stages with controls, evidence retention, and escalation triggers. The proposed continuous lifecycle also supports the manuscript's emphasis on monitoring and feedback. The figures and tables should be checked carefully for readability, consistency of terminology, and clear explanation within the main text. The authors should ensure that the relationships and feedback mechanisms shown in the architecture are sufficiently explained so that readers can understand how the proposed system would operate in practice.

8. Discussion and Governance Implications

The discussion effectively synthesizes the literature into a controlled-augmentation perspective. The manuscript appropriately emphasizes hybrid approaches, benchmark models, risk constraints, human oversight, and model-drift monitoring. The sections on explainability, independent validation, separation of duties, cybersecurity, vendor dependency, and staged deployment add practical depth. However, the discussion could be strengthened by providing more explicit consideration of situations in which the proposed architecture may face implementation difficulties, such as organizational resistance, limited data availability, integration costs, or conflicts between trading speed and governance requirements.

9. Saudi Arabia/Tadawul Context and Practical Relevance

The Saudi context is one of the manuscript's significant strengths. The review incorporates Tadawul-specific studies involving forecasting, automated trading, machine learning, and risk measurement. It also recognizes that Saudi-specific evidence remains relatively limited and that international findings cannot automatically be transferred to the Saudi brokerage environment. The recommendations concerning Arabic and bilingual financial information, local market structure, data quality, and regulatory accountability are particularly relevant. The manuscript should maintain a clear distinction between evidence directly established in Saudi Arabia and recommendations derived from international literature.

10. References, Limitations, and Overall Scholarly Quality

The manuscript provides a substantial reference base of 30 peer-reviewed articles with DOI information and acknowledges important limitations, including literature heterogeneity, the relatively small Saudi-specific evidence base, rapid methodological developments, and exclusion of some regulatory and practitioner sources. These limitations are appropriately recognized. Before publication, the authors should conduct a final reference and citation consistency check, verify all bibliographic details, and

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ensure that every important architectural recommendation is adequately supported by the cited evidence. The future-research agenda could also be connected more directly to measurable empirical validation of the proposed architecture.