

## REVIEWER'S REPORT

Manuscript No.: IJAR-59219

Title: Agentic AI for End-to-End Automation of the Data Quality Lifecycle: A DAMA- and NDMO-Aligned Governance Framework for Saudi Enterprises.

### 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 Id: JPR-369

### Reviewer's Comment for Publication.

The manuscript addresses a timely and important topic: the application of agentic artificial intelligence to end-to-end enterprise data-quality management while maintaining governance, accountability, and human oversight. The proposed separation between probabilistic reasoning and authoritative data changes, together with the risk-tiered autonomy model, provides a useful conceptual contribution. The integration of DAMA-oriented responsibilities with NDMO-oriented governance expectations also gives the paper a clear contextual focus for Saudi enterprises. The manuscript appropriately recognizes that the proposed framework is conceptual and that production-scale evidence remains limited.

The following minor revisions are recommended:

- Clarify the methodological reproducibility.** The review methodology describes the databases, search concepts, inclusion/exclusion criteria, and a final corpus of thirty DOI-verified peer-reviewed works. However, the exact search strings, search dates, and database-specific procedures are not provided. A concise supplementary search strategy or table would improve reproducibility.
- Clarify the relationship between the literature evidence and the proposed framework.** The manuscript synthesizes evidence from data-quality engineering, data-centric AI, autonomous agents, and governance, but the transition from individual studies to specific agent roles and autonomy levels could be made more explicit. A mapping table linking major cited studies to the corresponding framework components would strengthen the evidentiary basis.
- Strengthen the explanation of DAMA and NDMO alignment.** The governance mapping in Table 2 is useful, but the manuscript should clarify which elements represent established governance requirements and which are the authors' proposed operationalization of those requirements. This distinction is particularly important because the manuscript itself states that the Saudi alignment is not intended to constitute a complete legal or regulatory analysis.

## REVIEWER'S REPORT

4. **Clarify the meaning of “NDMO2” in the title.** The title refers to “NDMO2,” whereas the manuscript predominantly uses the term “NDMO.” The authors should define “NDMO2” explicitly and ensure consistent terminology throughout the manuscript.
5. **Provide additional explanation of evaluation criteria.** The proposed concept of “trustworthy quality throughput” is one of the manuscript’s notable contributions. The authors should provide a more explicit operational definition or formula for how this measure could be calculated and compared across enterprises. The manuscript already identifies useful supporting metrics such as detection precision/recall, time-to-detect, validated repair rate, false-repair rate, rollback rate, and evidence completeness.
6. **Improve the presentation of the proposed architecture.** Figures 1 and 2 are central to the paper. Their captions and surrounding discussion should clearly identify the boundaries between agents, deterministic controls, governance controls, human approval, and authoritative enterprise systems. This would make the architecture easier for practitioners to interpret.
7. **Clarify autonomy categories with concrete examples.** The manuscript appropriately proposes graduated autonomy according to consequence, reversibility, and confidence. A compact table containing examples of low-, medium-, and high-risk actions, together with the required approval level, would make this important concept more practically useful.
8. **Expand discussion of security risks specific to agentic systems.** The paper discusses least privilege, controlled tool gateways, kill switches, and segregation of duties. It would be beneficial to briefly address additional agent-specific risks such as prompt injection, malicious or manipulated tool outputs, unauthorized tool chaining, and compromised agent credentials, particularly because the proposed framework is intended for enterprise environments.
9. **Review the reference-to-claim alignment.** The references are generally relevant and current, with substantial coverage of data quality, data governance, data-centric AI, and autonomous agents. Nevertheless, the authors should perform a final citation audit to ensure that each broad technical or governance claim is supported by the most directly relevant source.
10. **Improve language and formatting consistency.** A final proofreading pass is recommended for punctuation, hyphenation, capitalization, terminology, and formatting of tables and headings. Terms such as “agentic AI,” “autonomous agents,” “DAMA-oriented,” and “NDMO-oriented” should be used consistently throughout.
11. **Strengthen the limitations section slightly.** The manuscript appropriately acknowledges that the evidence base for fully autonomous end-to-end data-quality operations is limited and that the proposed architecture requires production testing. It would be useful to explicitly distinguish limitations arising from the integrative-review methodology from limitations arising from the immaturity of the underlying technology.
12. **Clarify the empirical validation pathway.** Since the proposed framework is design-oriented rather than empirically validated, the manuscript would benefit from a short description of how future pilot studies could evaluate it—for example, through controlled comparisons of manual, rule-based, single-agent, and multi-agent workflows using common data-quality scenarios. This is consistent with the future research direction already proposed by the authors.

## Overall Assessment

The manuscript is **original, relevant, and potentially significant** for researchers and practitioners working in data quality, data governance, enterprise AI, and agentic systems. Its principal strength is the attempt to connect agentic automation with explicit governance boundaries rather than treating autonomy as unrestricted self-healing. The risk-tiered assurance loop, separation of reasoning from authority, provenance requirements, and emphasis on accountable human decision-making provide a coherent conceptual foundation.

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The issues identified are primarily matters of clarification, methodological transparency, terminology, presentation, and strengthening the connection between the reviewed evidence and the proposed framework. They do not require a fundamental restructuring of the manuscript. Therefore, **Accept after minor revision** is recommended.