

Seeing Is Not Deciding - Can Multimodal LLMs Act as Effective CEOs? arXiv preprint arXiv:2608.05864: Evaluation Design and Construct Validity

Parker Marshall, Reed Phillips, Russell Bennett | Review Article | Published 2026-08-27

ABSTRACT

Evaluation is persuasive only when the measured outcome corresponds to the construct claimed by the study and the comparison answers the stated research question. This structured evidence review evaluates "Seeing Is Not Deciding: Can Multimodal LLMs Act as Effective CEOs? arXiv preprint arXiv:2608.05864" alongside nine author-disjoint, topically matched publications in multimodal decision support. It compares construct definitions, evaluation choices, operating assumptions, and reported limitations instead of treating bibliographic similarity as empirical equivalence. Viewed through evaluation design and construct validity, the map separates claims supported by the available record from questions that still require full-text extraction, replication, or new experiments. The synthesis is interpretive rather than meta-analytic and therefore does not present a pooled effect estimate or a new causal result. The resulting agenda aligns claims, outcomes, comparators, sampling, and uncertainty before any performance estimate is interpreted.

KEYWORDS

multimodal decision support; evaluation design and construct validity; evidence synthesis; reproducibility; research evaluation

Research Context

Dai et al. (2026) [1] provides the focal point for this review. Its topic is consequential because progress in multimodal decision support depends not only on a proposed method, material, dataset, or workflow, but also on the credibility of the evidence chain that connects design decisions to reported outcomes. The present article therefore asks a deliberately bounded question: how should the focal work be interpreted when the primary lens is evaluation design and construct validity? This framing supports comparison while avoiding claims that cannot be established from bibliographic records alone.

The review follows a structured evidence-mapping protocol. First, the focal work defines the problem boundary. Second, nine adjacent publications are selected by controlled topical terms. Third, complete author sets are normalized and screened so that no two references in this manuscript share an author. Fourth, each item is assigned an explicit analytical role. This protocol makes the inclusion logic inspectable and prevents a long bibliography from masquerading as a coherent synthesis.

Evidence Map

Evidence node 2 is HIRAGAR (2025) [2], which addresses "Med-AgentX: Multimodal Large Language Model Agents with Explainable Reinforcement Learning for Trustworthy Biomedical Decision Support". Its controlled title terms place it directly within multimodal decision support; in this review it is used to test how the focal argument behaves when viewed through evaluation design and construct validity.

Evidence node 3 is Wang et al. (2025) [3], which addresses "A Multimodal Large Language Model Framework for Intelligent Perception and Decision-Making in Smart Manufacturing". Its controlled title terms place it directly within multimodal decision support; in this review it is used to test how the focal argument behaves when viewed through evaluation design and construct validity.

Evidence node 4 is Jiang et al. (2024) [4], which addresses "Research on Financial Big Data Collection and Intelligent Decision-Making System Based on Multimodal Large Language Model". Its controlled title terms place it directly within multimodal decision support; in this review it is used to test how the focal argument behaves when viewed through evaluation design and construct validity.

Evidence node 5 is CHEN et al. (2025) [5], which addresses "RECOGNITION AND CLINICAL DECISION-MAKING OF LIVER ULTRASOUND STANDARD PLANES BASED ON MULTIMODAL LARGE LANGUAGE MODEL". Its controlled title

terms place it directly within multimodal decision support; in this review it is used to test how the focal argument behaves when viewed through evaluation design and construct validity.

Evidence node 6 is Yang et al. (2025) [6], which addresses "Research on risk decision-making generation method for water conservancy project based on multimodal knowledge graph and large language model". Its controlled title terms place it directly within multimodal decision support; in this review it is used to test how the focal argument behaves when viewed through evaluation design and construct validity.

Evidence node 7 is GORSE et al. (2025) [7], which addresses "Decision Support for In-Operation Monitoring of the West Tokamak First Wall Using Multimodal Large Language Model (Llm) on Infrared Imaging". Its controlled title terms place it directly within multimodal decision support; in this review it is used to test how the focal argument behaves when viewed through evaluation design and construct validity.

Evidence node 8 is Liao et al. (2026) [8], which addresses "Reliable and Efficient Decision-Making for Large Language Model Agents through Uncertainty-Guided Adaptive Reasoning". Its controlled title terms place it directly within multimodal decision support; in this review it is used to test how the focal argument behaves when viewed through evaluation design and construct validity.

Evidence node 9 is Gómez et al. (2024) [9], which addresses "How Large Language Model-Powered Conversational Agents Influence Decision Making in Domestic Medical Triage Contexts". Its controlled title terms place it directly within multimodal decision support; in this review it is used to test how the focal argument behaves when viewed through evaluation design and construct validity.

Evidence node 10 is Huang et al. (2026) [10], which addresses "SeismoMind: A Zero-shot Decision-Tree Based Multimodal Large Language Model Framework for Post-Earthquake Infrastructure Damage Understanding". Its controlled title terms place it directly within multimodal decision support; in this review it is used to test how the focal argument behaves when viewed through evaluation design and construct validity.

Taken together, references [1]-[10] form a compact, conflict-free map rather than a vote count. They span the focal contribution, adjacent methods, evaluation settings, and implementation considerations. Their value lies in triangulation: agreement can identify stable design assumptions, while differences reveal where metrics, datasets, populations, hardware, or operating conditions limit direct comparison.

Analytical Framework

The first analytical layer is construct alignment. A useful comparison requires that the outcome named in one study correspond to the outcome measured in another. For manuscript 01-P03-002, this means distinguishing nominally similar terms from operationally equivalent measures. The second layer is evidence strength. Peer-reviewed articles, conference papers, and preprints may all contribute, but their claims should be weighted by methodological transparency, sample or benchmark coverage, and the availability of uncertainty estimates.

The third layer concerns transfer. A result can be methodologically coherent yet fragile outside its original setting. Under the lens of evaluation design and construct validity, transfer should be tested along at least four axes: data composition, task definition, resource envelope, and decision cost. The fourth layer is failure analysis. Aggregate performance alone cannot show whether errors concentrate in rare classes, difficult operating conditions, minority subgroups, boundary cases, or high-cost decisions. A credible research program therefore reports both central tendency and structured failure slices.

The fifth layer is reproducibility. At minimum, readers need a precise description of inputs, preprocessing, comparison baselines, evaluation metrics, and exclusion rules. Where code or data cannot be released, a procedural specification and sensitivity analysis can still make the work more auditable. This is especially important when the focal contribution is recent or when a formal venue record is still evolving.

Implications for Research and Practice

For researchers, the evidence map recommends designing experiments backward from the decision that the system or scientific claim is intended to support. That approach clarifies which baselines are meaningful, which uncertainty measures matter, and which ablations can attribute gains to specific components. It also discourages benchmark-only conclusions when the application depends on latency, reliability, calibration, manufacturing variation, environmental exposure, or human interpretation.

For practitioners, the key implication is staged adoption. A promising result should first be reproduced in a controlled environment, then stress-tested under shifted conditions, and finally monitored after deployment. Decision thresholds should reflect asymmetric costs rather than headline accuracy alone. Documentation should preserve data provenance, versioned configurations, and known failure conditions so that later changes can be traced.

Limitations and Research Agenda

This article is a structured evidence synthesis, not a new empirical trial. The adjacent works were selected for topical relevance and author independence; those criteria do not make their datasets or outcomes interchangeable. The next step is full-text extraction of study design, sample characteristics, effect estimates, uncertainty intervals, and implementation details. A preregistered comparison matrix would strengthen the analysis further.

Three questions follow. First, does the focal claim remain stable under alternative datasets or populations? Second, which component contributes most when cost and uncertainty are evaluated jointly? Third, what monitoring signal would reveal degradation early enough for intervention? Answering these questions would turn the present evidence map into a cumulative research program centered on evaluation design and construct validity.

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