

DFAS-MRL-01: TOWARD A META-SCIENCE STANDARD FOR RESEARCH LEGITIMACY

Governing Knowledge Production Before Outcomes Are Judged

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All such cases are documented in the **DFAS-Ethical Integrity Reporting (DFAS-EIR) Archive**, an **author-administered record designed to preserve traceability and research-integrity documentation, rather than an independent oversight body or institutional determination**.

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Supporting documentation and timestamped record are available on SSRN:

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5260517

ABSTRACT

Introduction: Contemporary academic systems evaluate scientific work primarily through outputs, results, methods, and narrative coherence, while the research path itself remains comparatively under-governed. This structural limitation becomes increasingly consequential under acceleration driven by artificial intelligence, automation, and high-volume research production.

Methods: This paper adopts a **normative meta-scientific approach** to conceptualize research legitimacy through governance rather than outcomes alone. It develops the framework through conceptual separation of methodological rigor, result validity, and path integrity, integrating research path governance, causal discipline, and temporal knowledge traceability while intentionally withholding operational mechanisms.

Results: The analysis establishes **traceable, temporally coherent, and governed decision paths** as a distinct condition of scientific legitimacy, independent of result correctness or institutional acceptance. It identifies **process-governed science** as an alternative to reliance on output-based validation alone and establishes the meta-scientific conditions under which future research-governance standards may emerge.

Discussion: The framework positions governance of the research path as a prerequisite for sustaining scientific legitimacy under accelerated knowledge production. Rather than introducing tools, metrics, or enforcement systems, it establishes a foundational conceptual standard for governing how scientific knowledge is produced, revised, and justified.

Keywords: Meta-Science Research Legitimacy (MRL); Research Governance; Path Integrity; Process-Governed Science; Temporal Coherence; Decision-Path Traceability; Scientific Legitimacy; Artificial Intelligence; DFAS.

1. INTRODUCTION

Why the Next Research Crisis Is Structural, Not Scientific

Research-integrity concerns are frequently expressed through replication failures, statistical misuse, methodological weaknesses, or individual misconduct. Within the argument developed here, these concerns primarily reveal problems visible at the level of scientific outputs while leaving a deeper governance question unresolved: how the research path through which knowledge is produced, revised, justified, and evaluated over time is itself governed.

This paper advances the proposition that an important source of instability in contemporary science is **structural**. Specifically, it identifies the failure to govern the **research path** as a first-order object of scientific evaluation. Academic evaluation remains strongly concentrated at the endpoint—through results, methods, and narrative coherence—while the decision sequence generating those outputs may remain informal, incompletely traceable, or retrospectively reconstructable.

Grounded in longitudinal observation of the research lifecycle from hypothesis formation through methodological commitment, revision, review, and institutional validation, this work identifies a recurring governance problem: research outcomes may be evaluated without equivalent visibility into the decision paths that produced them. Hypotheses can evolve without preserved rationale, methodological shifts can be justified retrospectively, and evaluative judgments can occur without complete procedural traceability. Under these conditions, scientific legitimacy risks being **asserted** through authority and convention rather than **demonstrated** through governed process (Alaali, 2025a; Alaali, 2026e).

This structural limitation becomes increasingly consequential under acceleration. Artificial intelligence, automation, and high-volume research output compress research cycles, expand revision capacity, and place additional pressure on authority-based trust mechanisms. The resulting challenge is therefore not only one of truth or methodological correctness, but also one of legitimacy: how institutions can defensibly explain why knowledge claims are accepted, rejected, or funded when the decision paths generating them remain opaque (Alaali, 2025b; Alaali, 2025c).

The contribution of this paper is to shift the locus of scientific legitimacy from outputs alone toward governance. It advances a meta-scientific argument that scientific validity should incorporate **traceable, temporally coherent, and governed decision paths** as a domain distinct from result correctness and institutional endorsement. In doing so, it positions research governance not merely as an ethical supplement or methodological refinement, but as a prerequisite for sustaining scientific legitimacy under contemporary conditions of scale and automation (Alaali, 2026d).

Epistemic Status of This Work

This paper advances a **normative meta-scientific argument**. It does not present empirical findings, methodological tools, performance metrics, or enforcement mechanisms. Its purpose is neither descriptive nor predictive, but constitutive.

The validity of this work is therefore not claimed through empirical correspondence, replication outcomes, or statistical performance. It is evaluated through the internal coherence of its diagnosis of a structural incompleteness in research evaluation and its articulation of conditions under which scientific legitimacy may be governed. Specifically, the paper defines research governance as a distinct epistemic domain: the governance of how knowledge is produced, rather than what conclusions are reached.

The manuscript adopts a **deliberately bounded citation architecture**. Its references are restricted to the foundational DFAS works from which the proposed meta-scientific doctrine is internally derived. This boundary is intentional rather than an attempt to provide an exhaustive review of external research-integrity, open-science, or methodological literature. Comparative positioning against external practices and frameworks is outside the constitutive purpose of this paper and may be addressed separately in subsequent comparative or validation research.

Accordingly, this work deliberately withholds operationalization. It does not propose technologies, indicators, institutional procedures, or compliance systems. Premature operationalization without prior epistemic stabilization risks superficial adoption, institutional misuse, and governance distortion (Alaali, 2025b; Alaali, 2025c).

This paper should therefore not be read as a policy proposal, an ethics framework, a literature review, or a methodological critique. It establishes a **conceptual standard space** within which future research standards, governance architectures, comparative assessments, and institutional mechanisms may responsibly emerge once epistemic conditions are stabilized. Its role is foundational, not instrumental.

The novelty of this work lies not in proposing new tools or policies, but in redefining the conditions under which scientific legitimacy itself can be claimed.

2. CITATION ARCHITECTURE AND EPISTEMIC BOUNDARY

This paper adopts a **deliberately bounded citation architecture**. Its references are restricted to the foundational DFAS works from which the Meta-Science Research Legitimacy Layer (MRL) is conceptually derived. This boundary is intentional and reflects the constitutive purpose of the paper rather than an attempt to provide an exhaustive review of research-integrity, open-science, methodological, or philosophy-of-science literature.

The use of self-citation serves a specific epistemic function: **conceptual provenance and internal traceability**. The cited DFAS works document the prior development of the governance principles, authorship structures, editorial ethics, causal discipline, and research-path concepts upon which

MRL builds. These citations are therefore used to identify the internal lineage of the proposed doctrine rather than to establish its validity through authorial authority or citation frequency.

Accordingly, the absence of external references should not be interpreted as a claim that related concepts, practices, or governance mechanisms do not exist outside DFAS. Nor does this paper claim comparative superiority, uniqueness across the entire literature, or empirical validation against external systems. Such claims would require a different research design and an explicit comparative evidence base.

Maintaining this epistemic boundary also preserves the distinction between **constitutive development and comparative validation**. The present paper defines MRL and establishes its internal conceptual architecture. Subsequent research may independently compare these propositions with external theories, research-integrity systems, open-science practices, institutional mechanisms, and operational approaches to determine areas of convergence, divergence, complementarity, or conceptual distinctiveness.

The bounded citation architecture is therefore a deliberate component of the paper's research design: **internal sources establish conceptual provenance; external comparison remains a separate stage of validation and theoretical positioning**.

3. FROM SCIENCE TO META-SCIENCE

Why Governing Knowledge Requires a Higher-Order Framework

Science governs discovery.

Meta-science governs the conditions under which discovery remains legitimate.

This section advances the necessity of a meta-scientific level of analysis when scientific evaluation operates under conditions of increasing scale and acceleration. Traditional scientific systems evaluate claims through methods, data, results, and the **context of discovery**, while the **conditions of justification** surrounding how research decisions are formed, revised, and defended may remain comparatively under-governed.

Within the present framework, the critical issue is not the conceptual distinction between discovery and justification itself, but the governance of the decision path connecting them. Artificial intelligence, automation, and iterative workflows compress research timelines and expand the capacity for rapid revision and reconstruction. Under these conditions, scientific norms may establish what counts as evidence without providing equivalent governance over how evidentiary paths are constructed, altered, and temporally preserved (Alaali, 2025a; Alaali, 2026e).

Meta-science becomes necessary at this governance boundary. It does not replace science or determine the truth of scientific claims. Instead, it addresses the **conditions under which scientific evaluation itself remains legitimate**. Without a higher-order framework governing the relationship between discovery processes and justification structures, evaluation risks depending disproportionately on journals, reviewers, metrics, and institutional reputation rather than demonstrable procedural integrity (Alaali, 2025b).

Research governance must therefore be understood not as a methodological supplement, ethical overlay, or transparency add-on, but as a meta-scientific requirement governing the conditions within which methods can be assessed, results interpreted, and institutional decisions defended. In

this formulation, governance does not replace methodological or epistemic standards; it establishes an additional structural condition for their legitimate evaluation (Alaali, 2025c; Alaali, 2026d).

4. THE UNGOVERNED RESEARCH PATH

The Missing Layer in Contemporary Scientific Systems

This framework identifies the **research path** as a comparatively under-governed layer of contemporary scientific evaluation. While final outputs are subject to methodological, editorial, and institutional scrutiny, the sequence of decisions that produces them may not receive equivalent temporal and procedural scrutiny. Hypotheses may change without preserved rationale, methodological commitments may be revised without complete temporal traceability, and analytical choices may subsequently be incorporated into coherent final narratives.

The significance of this governance gap increases under accelerated research production. High-volume output, AI-assisted drafting, and rapid iteration substantially expand the capacity to revise hypotheses, analyses, and narratives. Without preserved decision-path traceability, distinguishing disciplined adaptation from post-hoc reconstruction becomes increasingly difficult (Alaali, 2026d; Alaali, 2026e).

The resulting problem is structural rather than an allegation of misconduct. Validation of a final result does not necessarily establish the integrity of the decision path through which that result was produced. Likewise, peer review of the final artifact cannot fully reconstruct decision sequences that were not documented or temporally preserved. This creates a governance asymmetry between the scrutiny applied to scientific outputs and the visibility available into their production paths (Alaali, 2025b).

MRL conceptualizes this asymmetry as **architectural insufficiency**. Where research paths remain incompletely traceable, legitimacy may depend disproportionately on coherence, plausibility, and institutional authority rather than demonstrable decision-path integrity. Under conditions of scale and automation, this creates increasing difficulty in providing procedurally defensible grounds for research evaluation, including acceptance, rejection, and funding decisions (Alaali, 2025a; Alaali, 2025c).

5. ARTIFICIAL INTELLIGENCE AS A STRUCTURAL STRESS TEST

Acceleration Without Governance

Within the MRL argument, artificial intelligence is conceptualized not as the origin of the governance problem, but as a **structural stress test that intensifies and exposes it**.

AI accelerates research production, expands revision capacity, and increases the volume and speed at which scientific narratives can be generated and stabilized. Drafting, revision, simulation, and analytical iteration can occur at a pace that places increasing pressure on conventional review and authority-based trust mechanisms. From the MRL perspective, this acceleration makes the distinction between output coherence and demonstrable procedural integrity increasingly consequential (Alaali, 2025b; Alaali, 2025c).

Under AI-assisted conditions, the boundary between discovery and reconstruction can become increasingly difficult to observe when decision sequences are not preserved. Iterative generation permits rapid hypothesis cycling, analytical revision, and narrative convergence without necessarily creating corresponding temporal records of how those changes occurred. The resulting

problem is not AI use itself, but the expansion of research-production capacity without equivalent governance of the research path (Alaali, 2026d; Alaali, 2026e).

This produces the **AI Paradox**:

AI simultaneously exposes governance failure while accelerating the conditions that make governance increasingly difficult to design.

The paradox is therefore architectural rather than technological. AI does not inherently undermine scientific standards; it increases pressure on evaluation systems in which the research path is not governed as a distinct object of legitimacy. As production and revision capacity increase, output coherence alone becomes progressively less informative about the integrity of the process through which an output emerged.

MRL addresses this problem through **research governance**. Governance of the research path provides a distinct basis for evaluating procedural legitimacy without substituting for methodological rigor or result validity. Under accelerated research production, AI therefore functions as a stress test revealing the need for traceable, temporally coherent, and governable decision paths (Alaali, 2025a; Alaali, 2025b).

6. RESEARCH GOVERNANCE AS A META-SCIENTIFIC PRINCIPLE

(Conceptual Lock Point)

Definition

Research governance is the governance of **how knowledge is produced**, not merely what is published.

This definition positions the research path—the sequence of decisions, revisions, constraints, and justifications through which knowledge is produced—as a distinct object of scientific legitimacy. Governance, in this sense, does not determine truth claims, methodological adequacy, or empirical correctness. It governs the conditions under which such evaluations can be procedurally and temporally defended (Alaali, 2025a).

Research governance therefore operates at a meta-scientific level. It does not replace methods, results, or institutional evaluation; it establishes an additional governance layer within which scientific judgments can remain traceable and defensible (Alaali, 2026d).

Conceptual Separation

This paper establishes a non-substitutable separation between three domains:

- **Methodological rigor**
- **Result validity**
- **Path integrity**

These domains are conceptually distinct. Methodological rigor concerns the consistency and appropriateness of techniques. Result validity concerns the correctness, robustness, or explanatory power of outcomes. Path integrity concerns the traceability, temporal coherence, and governability of the decision sequence through which those outcomes were produced.

The central proposition of MRL is that these domains cannot substitute for one another. Methodological rigor cannot establish the integrity of an undocumented decision path. Correct results cannot retroactively legitimize an ungoverned process. Institutional acceptance cannot compensate for the absence of procedural traceability (Alaali, 2025b; Alaali, 2025c).

This **non-substitutability principle** constitutes the conceptual lock point of MRL. Output-based validation may establish methodological or result-level legitimacy, but it cannot independently establish path integrity. Governance of the research path therefore represents a distinct structural condition of scientific legitimacy under contemporary conditions of scale, automation, and accelerated production (Alaali, 2026e).

7. CORE GOVERNANCE DIMENSIONS (CONCEPTUAL ONLY)

(Normative scope; no mechanisms disclosed)

This section defines **what must be governed**, not how governance is implemented. It delineates the minimal conceptual dimensions required for research governance to function as a meta-scientific condition of legitimacy. These dimensions are normative and intentionally non-operational; they establish epistemic boundaries rather than procedural prescriptions (Alaali, 2025a).

The dimensions defined below should not be interpreted as specific research practices, tools, or implementation mechanisms. Documentation systems, preregistration mechanisms, review procedures, version-control practices, or other operational arrangements may potentially instantiate aspects of these dimensions, but they are not equivalent to the meta-scientific governance conditions themselves. MRL defines the governance requirement; it does not prescribe its operational form.

7.1 Documentation Governance

Documentation governance refers to the obligation to preserve reasoning, decisions, revisions, and constraint changes as **epistemic artifacts** rather than ancillary records. Their significance lies not merely in transparency but in preserving the traceability of the research path. Without such governance, decision sequences may collapse into retrospective narratives that cannot be reliably distinguished from post-hoc reconstruction (Alaali, 2026e).

7.2 Review Governance

Review governance requires evaluative judgments to preserve **scope, rationale, and procedural basis**. Decisions to accept, reject, revise, or endorse research should therefore remain traceable to their stated evaluative grounds rather than depend solely on implicit authority or reputational inference. Within MRL, review governance concerns the integrity of the evaluative path itself rather than merely its final decision (Alaali, 2025b).

7.3 Validation Governance

Validation governance establishes a strict separation between three non-substitutable domains:

- path integrity,
- result correctness,
- institutional acceptance.

Validation in one domain cannot establish validity in another. Correct results do not retroactively demonstrate path integrity, while institutional endorsement does not substitute for procedural traceability. This separation prevents distinct forms of legitimacy from being collapsed into a single endpoint judgment (Alaali, 2025c; Alaali, 2026d).

7.4 Temporal Governance

Temporal governance requires decisions to remain interpretable **within their original temporal context**, preserving the sequence in which assumptions, constraints, information, and revisions occurred. Its purpose is to prevent later knowledge from retrospectively reconstructing the apparent logic of earlier decisions. Temporal traceability therefore provides the basis for distinguishing a contemporaneously governed research path from a retrospectively stabilized account of that path (Alaali, 2026e).

8. FROM OUTPUT-BASED VALIDATION TO PROCESS-GOVERNED SCIENCE

Within the MRL perspective, contemporary scientific validation remains strongly oriented toward outputs. Legitimacy is commonly assessed through results, methodological form, narrative coherence, and institutional evaluation. Under conditions of accelerated knowledge production, reliance on these dimensions alone may become insufficient where the decision paths producing scientific outputs remain incompletely traceable.

Research governance introduces an additional paradigm: **process-governed science**. In this paradigm, legitimacy incorporates traceability, temporal coherence, and governed decision paths alongside the evaluation of outputs. Methods and results remain necessary, but within MRL they do not independently establish path integrity (Alaali, 2025a).

This transition is intended to complement rather than replace existing scientific standards. Under conditions of increasing scale, automation, and artificial intelligence, process-governed science provides an additional basis for procedurally defensible evaluation by extending scrutiny from final artifacts to the decision paths through which they were produced. Legitimacy is therefore not relocated away from outputs, but expanded to include the governability of the research process itself (Alaali, 2026d).

9. ANTICIPATING THE NEXT RESEARCH CRISIS

Within the MRL perspective, the next major research crisis may extend beyond fraud or replication.

It may increasingly become a crisis of **legitimacy**.

As AI-assisted research expands the scale and speed of knowledge production, journals, universities, and funders may face increasing difficulty in defending acceptance, rejection, and allocation decisions when the decision paths underlying those judgments remain insufficiently traceable. Under such conditions, stakeholders may require defensible records of **how decisions were made**, not merely what conclusions were reached. Output-centric validation alone may therefore become insufficient for sustaining institutional legitimacy (Alaali, 2025b; Alaali, 2025c).

Research governance is conceptualized here not merely as a response to such pressures, but as a **structural condition for preserving scientific legitimacy under acceleration**. By establishing governed research paths as a basis of legitimacy, institutions may strengthen the procedural defensibility of evaluative decisions without relying exclusively on opaque trust mechanisms, reputational inference, or discretionary authority (Alaali, 2026e).

10. INSTITUTIONAL IMPLICATIONS

(Non-operational by design)

Within the MRL perspective, the implications of research governance are primarily institutional rather than technical. This section outlines how governance may reorient institutional roles without prescribing tools, metrics, or enforcement architectures. The objective is to identify implications for **institutional responsibility** under conditions of scale and acceleration, not to propose implementation details (Alaali, 2025a).

10.1 Journals

From ethical policies to governance capacity

Journals commonly address research integrity through ethical guidelines, disclosure requirements, and post-publication correction mechanisms. Within MRL, these mechanisms may remain insufficient for establishing path integrity because regulation of conduct does not necessarily provide traceability of the research path itself. Governance capacity, by contrast, concerns the ability to evaluate **how** knowledge claims were produced, revised, and justified over time.

Where such governance capacity is absent, editorial evaluation may depend more heavily on output plausibility, reviewer judgment, and reputational inference. This may create legitimacy challenges when acceptance or rejection decisions cannot be procedurally reconstructed or defended. Research governance therefore extends editorial responsibility toward **procedural defensibility**, without replacing existing ethical mechanisms or altering the journal's evaluative autonomy (Alaali, 2025b; Alaali, 2025c).

10.2 Universities

From reputational endorsement to procedural protection

Universities can function as legitimacy amplifiers because degrees, affiliations, and institutional branding confer credibility on research outputs without independently establishing the integrity of the decision paths that produced them. Under accelerated research production, reliance on institutional endorsement alone may therefore become increasingly insufficient.

Within MRL, research governance extends the institutional role toward **procedural protection**. This does not require universities to guarantee the correctness of research results; rather, it positions them as potential safeguards of the integrity of research processes conducted under their auspices. Procedural protection may strengthen institutional credibility by supporting the traceability and temporal coherence of decisions, revisions, and justifications independently of outcome quality (Alaali, 2025a; Alaali, 2026e).

10.3 Funders

From deliverables to decision integrity

Funding institutions commonly evaluate research through milestones, outputs, and impact-related measures. While these dimensions remain important, a predominantly deliverable-oriented approach may provide limited visibility into the integrity of decision paths, particularly under AI-assisted workflows.

Research governance extends funding accountability toward **decision integrity**. Within MRL, evaluation would therefore consider not only whether deliverables were produced, but also whether the research path remained governed and traceable. This principle is not intended to constrain exploratory research or prescribe funding procedures; rather, it identifies procedural justification as an additional basis upon which the legitimacy of research and funding decisions may be defended (Alaali, 2025c; Alaali, 2026d).

11. The Epistemic Status of This Framework

This paper advances a normative meta-scientific argument rather than an empirical claim. It does not test hypotheses, compare interventions, or measure performance. Its validity rests on the internal coherence of its diagnosis of structural incompleteness in contemporary research evaluation and its articulation of necessary conditions for research governance (Alaali, 2025a).

The framework defines a conceptual standard space within which operational systems, institutional policies, and technical architectures may later emerge. It intentionally withholds mechanisms, metrics, and enforcement designs to preserve the distinction between **governance definition and governance execution** and to avoid premature operationalization that may produce superficial compliance or governance distortion (Alaali, 2025b; Alaali, 2025c).

The framework follows the **bounded citation architecture defined in Section 2**, preserving the distinction between internal conceptual development and subsequent external comparative validation.

This work therefore serves two capacities simultaneously. It constitutes the conceptual foundation of a broader research program concerned with research governance under acceleration while remaining independently complete as a meta-scientific argument. Its contribution lies in establishing **path integrity as a distinct and non-substitutable domain of scientific legitimacy**, alongside but not replaceable by methodological rigor, result validity, or institutional acceptance (Alaali, 2026d; Alaali, 2026e).

12. LIMITATIONS AND FUTURE DIRECTIONS

Limitations

This work is intentionally conceptual and non-operational. It does not propose metrics, algorithms, enforcement architectures, or empirical tests. It defines necessary governance conditions rather than sufficient implementations. These boundaries are deliberate: operationalizing the framework before its epistemic distinctions are stabilized risks conflating governance definition with governance execution and encouraging superficial compliance rather than substantive path integrity (Alaali, 2025a; Alaali, 2025b; Alaali, 2025c).

The deliberately bounded citation architecture also means that this paper does not undertake systematic comparison with external theories, research-integrity systems, open-science practices, or implementation mechanisms. This boundary limits claims of comparative differentiation but preserves the paper's constitutive purpose: establishing MRL internally before testing its relationship to external systems.

Future Directions

Future research may examine the relationship between MRL and existing research-governance practices through dedicated comparative analysis without collapsing conceptual governance

conditions into particular implementation mechanisms. Such work may test whether existing practices fully, partially, or indirectly satisfy the requirements of documentation, review, validation, and temporal governance established by MRL.

Subsequent research may also translate these governance conditions into standards, domain-specific implementations, technical architectures, or controlled pilot studies. Such extensions should preserve the **non-substitutability of methodological rigor, result validity, path integrity, and institutional acceptance**, while safeguarding against metricization, compliance theater, and post-hoc rationalization (Alaali, 2026d; Alaali, 2026e).

13. CONCLUSION

Governing Knowledge Before It Collapses

Science does not fail merely because answers change.

Within the MRL perspective, a more fundamental legitimacy problem emerges when the path to those answers becomes unverifiable.

This paper is not a policy proposal. It does not prescribe rules, enforcement mechanisms, or institutional reforms. It defines the structural conditions under which scientific legitimacy may be evaluated beyond outcomes alone.

Under conditions of acceleration driven by artificial intelligence, automation, and scale, reliance on output-based validation alone may become increasingly insufficient for sustaining scientific legitimacy. Authority-based trust mechanisms, reputation, coherence, and institutional endorsement may provide limited assurance of path integrity when decision paths remain opaque or temporally ungoverned (Alaali, 2025b; Alaali, 2025c).

This paper has argued for a structural extension from validating artifacts toward governing the processes through which those artifacts are produced. Research governance, defined as the governance of how knowledge is produced, provides an additional condition under which methods can be evaluated, results interpreted, and institutional decisions procedurally defended. It does so without constraining discovery, prescribing tools, or privileging outcomes (Alaali, 2026d; Alaali, 2026e).

By conceptualizing scientific legitimacy through **process-governed science**, this framework provides a basis for **institutionally defensible judgment under scale**, particularly where research outputs expand faster than conventional evaluative systems can accommodate. Within MRL, governing the research path is therefore conceptualized not merely as an ethical preference or technological response, but as a **meta-scientific condition for sustaining legitimacy under accelerated knowledge production** (Alaali, 2025a).

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- **Procedural Violations:** Any departure from declared editorial or peer review standards will be logged.
- **Peer Review Misconduct:** Evidence of bias, conflict of interest, or failure to follow fair-review practices will be recorded.
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All such cases are documented in the **DFAS - Ethical Integrity Reporting (DFAS-EIR) Archive**, serving as an immutable record for oversight, research integrity, and enforcement of ethical compliance across the publishing process.

For more information, refer to SSRN:

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5375339

Appendix A – Note 2: DFAS-FEP Authorship Classification and Compliance:

This manuscript complies with the **DFAS-FEP Protocol**, a structured authorship governance framework introduced by the author (Alaali, 2025c).

DFAS-FEP (Dynamic Financial Applied Meta-Science – Future Engine Prototype Protocol) provides an ethical protocol to ensure transparent and accountable authorship in AI-assisted financial research. It defines and enforces the distinction between fully human-generated content and AI-supported elements to uphold integrity, intellectual responsibility, and traceability across all components of this manuscript.

This classification directly supports the ethical architecture of the **DFAS-IFRS Code of Ethics**, which applies DFAS-FEP standards to financial disclosures influenced by artificial intelligence.

For reference, see the published DFAS-FEP Protocol:

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5260517

Appendix A.1 – (DFAS-FEP) Authorship Classification Table for This Manuscript (DFAS-MRL-01)

Manuscript Component	DFAS–FEP Class	Justification (Concepts Explicitly Introduced in DFAS-MRL-01)
Core Conceptual Philosophy and Meta-Theoretical Framework	Class 1	Introduction of Meta-Science Research Legitimacy (MRL) as a distinct epistemic layer; definition of research legitimacy as a property of governed

		decision paths , not outcomes; reframing the research crisis as structural rather than scientific ; positioning legitimacy before results, methods, and institutional acceptance ; articulation of process-governed science as an alternative to output-based validation; establishment of governance as a prerequisite for scientific legitimacy
Causal Science and System Architecture (Laws, Algorithms, Engines, Decision Gates)	Class 1	Formal separation of discovery vs. justification domains; causal identification of the ungoverned research path as the failure point in modern science; definition of the Decision-Path Integrity Principle ; establishment of non-substitutability between path integrity, result correctness, and institutional endorsement; articulation of the AI Paradox (acceleration exposes governance absence); rejection of endpoint-only validation as structurally incomplete.
Calibration Principles and Contextual Governance Logic	Class 1	Normative calibration of legitimacy independent of correctness; definition of temporal coherence as a governance requirement; calibration of governance prior to methods and results; explicit exclusion of metrics, rankings, performance scores, or enforcement tools; boundary setting between epistemic governance and policy or ethics frameworks ; contextualization of governance under conditions of AI-driven acceleration.
Operational Blueprint and Implementation Architecture	N/A	Intentionally absent by design ; formal declaration of non-operational status ; conceptual lock preventing premature translation into tools, indicators, or compliance systems; establishment of epistemic stabilization before implementation as a governing rule; rejection of operationalization to avoid compliance theater and governance distortion.
Illustrative Case Studies and Applied Scenarios	Class 1	Explicit non-use of case studies as empirical evidence; use of conceptual illustrations only (AI as a structural stress test and the limitations of authority-based trust); use of hypothetical structural scenarios to demonstrate potential legitimacy failure without empirical dependence; preservation of the manuscript's constitutive, rather than empirical, character.
Narrative Structure and Analytical Exposition	Class 2	Language refinement, coherence, and structural clarity only; no contribution to conceptual, causal, or epistemic design.
Tables, Figures, and Conceptual Diagrams	Class 2	Structural layout and formatting only (conceptual separations, domain distinctions); no conceptual input.
Literature Review and Cross-Referencing	Class 2	Citation formatting and reference alignment; all synthesis, diagnosis, and framing are human-authored.
Appendices and Compliance Documentation	Class 2	Formatting of epistemic status statements, scope limitations, and classification records; DFAS-FEP compliance layout only.

Overall Manuscript Classification: Class 2 – AI-Assisted, Author-Validated

Core Conceptual Framework, Causal Architecture, and Governance Logic: Class 1 – Fully Human-Authored

Verification Status: This DFAS-FEP classification constitutes an author-declared authorship record under the DFAS-FEP protocol. It does not constitute independent verification, third-party certification, or external validation of the manuscript's authorship claims.

Additional Clarifications

Human-Originated Content (Class 1):

All concepts introduced in **DFAS-MRL-01** — including **Meta-Science Research Legitimacy (MRL)**, **process-governed science**, **decision-path integrity**, **temporal coherence**, **non-substitutability of legitimacy domains**, **AI as a structural stress test**, **governance before outcomes**, and the **intentional non-operational doctrine** — were independently conceptualized and authored by the contributor. No AI tools were used in conceptual reasoning, causal diagnosis, or framework construction.

AI-Assisted Content (Class 2):

AI tools were used **only** for linguistic refinement, formatting, and citation alignment. These uses were strictly non-substantive and manually validated.

Integrity Safeguards:

This manuscript is compliant with **DFAS-FEP v1.6**, maintains full authorship traceability, and preserves epistemic boundaries by design

Appendix B – Version History Log (VHL)

Version 1.0 – First Published in OSF Dated 25-02-2026.

- **OSF Archive:** https://osf.io/preprints/acctr/2jxv4_v1
- Published in Zenodo in August 27, 2026: <https://zenodo.org/uploads/22131373>
- The manuscript's conceptual logic, meta-scientific legitimacy framework, causal separation principles, and governance positioning were fully human-authored. AI tools were used exclusively for non-substantive support functions, limited to layout adjustments, citation formatting, and controlled phrasing refinements, in full compliance with **DFAS-FEP v1.6** presentation standards.
- **Alaali-ACS: 0 | Classification: Class II – AI-Assisted, Author-Validated**

Version 2.0 – Major Revision in Response to Journal Review, September 4, 2026.

- Clarified the manuscript's normative, constitutive, and non-operational status; strengthened the separation between methodological rigor, result validity, and path integrity; and introduced the bounded citation architecture.
- Refined claims concerning AI, institutional legitimacy, and process-governed science, and clarified the author-developed status of DFAS governance protocols and the author-declared nature of DFAS-FEP classification.
- **Alaali-ACS: 0 | Classification: Class II – AI-Assisted, Author-Validated**