Designing Decentralized Peer Review: Stakeholder Insights from Traditional Publishing

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Abstract

Peer review remains the central mechanism through which scientific credibility is established, yet it faces mounting pressures of scale, bias, and invisibility. To inform the design of decentralized and transparent peer-review systems, twelve professors—ranging from early-career faculty to senior editors—were interviewed about their experiences within traditional publishing. Semi-structured conversations explored the incentives to publish and review, perceptions of fairness, workload challenges, and openness to alternative models. Thematic analysis revealed both deep respect for the ideals of peer review and frustration with its operational shortcomings. Participants emphasized recognition, transparency, and balanced incentives as essential to sustaining scholarly integrity. These findings provide a grounded framework for reimagining peer review on decentralized platforms such as Cardano, where identity verification, auditability, and equitable reward structures can address many of the persistent pain points identified by experienced scholars.

Introduction

Peer review is often described as the “consensus mechanism of science”—the process by which knowledge earns legitimacy within the scholarly community. Yet despite its foundational status, the peer-review system remains opaque, labor-intensive, and dependent on uncompensated goodwill. Recent technological shifts, including the emergence of blockchain-based publishing ecosystems, invite a critical question: how might the principles of openness, verification, and distributed governance improve the review process without compromising its academic rigor?

This question guided the current phase of the Agnostica project, funded under Cardano’s Catalyst Fund 13. Earlier milestones synthesized theoretical and technological developments in decentralized publishing. The present study complements that work by examining how established scholars themselves perceive the traditional peer-review process—the very system that decentralized approaches aim to reform. Their lived experiences reveal both enduring strengths and structural weaknesses that any new system must acknowledge.

Among those interviewed was Dr. Gale, a senior scholar at her university, long-time editor of leading journals, and chair of her institution’s promotion and tenure committee. Her reflections, alongside those of eleven other professors across disciplines, illuminate the evolving incentives, burdens, and values underpinning scholarly publishing today.

Methods

Twelve professors from U.S. research universities participated in semi-structured interviews between late 2024 and early 2025. Participants ranged from second-year

assistant professors to full professors with extensive editorial board experience. All had served as reviewers or editors, and most had firsthand experience navigating promotion and tenure processes.

Interviews were guided by themes identified in previous project milestones—such as incentives to publish, incentives to review, and critiques of the peer-review process—but remained open to emergent ideas. Conversations lasted between 20 and 70 minutes. One was conducted via Zoom, one was audio recorded in full, and the remaining ten were documented through detailed notes.

Data were analyzed inductively through thematic synthesis. Initial codes were drawn from the earlier literature review (e.g., incentives, legitimacy, reform) and expanded as new insights emerged. Themes were iteratively refined to capture both the shared patterns and individual nuances across participants.

Results

Incentives to Publish

Participants agreed that publishing remains the primary measure of academic legitimacy. As one senior scholar reflected, “It’s always been important for people to publish… in psychology even more than education back when I started, the quality of the journal was always, very, very important.” Dr. Gale emphasized that the modern emphasis extends beyond counts: “We look at quantity and quality. So you have to have sufficient numbers, but it’s really about impact… When we mean impact, we don’t mean just people read it. They look at what’s the actual impact. Can you demonstrate impact?” Impact, she explained, can mean influence within academia or in real-world settings—sometimes as tangible as a citation in a Supreme Court case. Yet faculty without research appointments are often “de-incentivized to publish because their teaching loads are high,” while tenure-track scholars face the reverse pressure. Publication remains a proxy for prestige and professional advancement, but its meaning varies by institutional context. Incentive misalignment between teaching- and research-oriented roles perpetuates systemic inequities.

Institutional Variation and the ‘Least Publishable Unit’

Expectations of productivity differ sharply by field and institution. “The LPU—the least publishable unit—doesn’t fly at a place like my university,” Dr. Gale noted, describing tenure cases where quantity alone failed: “This person had a lot of publications, but they were not considered particularly high quality or impactful. And the case did not go forward.” She contrasted psychology’s high publication threshold with other fields: “In accounting, if you have like six publications, you’re considered a superstar… that six publications is not gonna get you tenure in psychology for sure.” Metrics of quality and impact are socially constructed, varying by discipline and institutional culture. Any decentralized reputation system must accommodate this plurality rather than impose a universal metric.

Incentives to Review

Reviewing was widely seen as both a professional obligation and a critical learning tool. “The best way to figure out how to publish is by reviewing… you see good papers and realize what makes a good paper and you see not-so-great papers and realize maybe some things you would not do.” Early in her career, Dr. Gale completed roughly one review per week as an editor. Later, she became more selective: “Younger people should be having the opportunity and taking the opportunity to do the reviews.” Participants acknowledged that reviewer fatigue has reached crisis levels since COVID-19, as more authors submit but fewer volunteer to review. Reviewing provides professional insight and community stewardship, yet remains undervalued labor. Sustainable reform must balance intrinsic motivation with credible recognition systems.

Strengths and Weaknesses of Peer Review

Despite frustrations, all participants reaffirmed peer review’s necessity. “When it works well, you get a set of qualified good reviewers… the author addresses those strengths and weaknesses in a revision and publishes, and that’s how peer review is supposed to work.” Yet reviewers are “humans—fallible, biased, overworked.” The process can feel opaque to authors: “It’s a pretty opaque process… as a submitter, you don’t really know what’s going on.” These contradictions—peer review’s ideal of rigor versus its uneven execution—define its current legitimacy crisis. Scholars respect peer review’s gatekeeping role but crave transparency and accountability. Decentralized mechanisms could make the process auditable without eroding professional discretion.

Economic Model and Workload Pressures

Participants described the peer-review system as economically unsustainable. “Everybody wants their paper reviewed, but nobody wants to review anybody else’s paper.” As publishers profit from subscription fees, the core labor—reviewing and editing—remains unpaid. “Back in the day they used to have copy editors,” one lamented, “now they don’t even catch a typo.” The current model externalizes costs onto academics while concentrating value in centralized publishers. Blockchain-based systems could redistribute value through transparent, programmable incentives.

Alternative Models and Reforms

Interviewees expressed curiosity about innovation but warned against discarding the traditional model entirely. “It’s interesting and worthwhile exploring alternative models, but for every problem you solve, you create a few others.” Another added, “The traditional publication model is the worst system in the world—except for all the other models in the world.” The rise of misinformation made some wary of dismantling established review systems: “Right now we are in a time of just the worst spread of mis and disinformation ever… to give up the traditional model, even with all its flaws, seems dangerous.” Reform must enhance trust and traceability rather than replace expertise. The path forward lies in augmenting peer review with transparent verification, not discarding it.

Transparency and Accountability

Transparency emerged as the most consistent theme across interviews. “There should be some transparency of the review process because maybe that would hold reviewers more accountable.” “Editors have to play a role in that… saying, I’m going to send this back to you and you’re taking out this part here.” Participants suggested publishing anonymized reviews or creating audit trails to deter incivility and bias. “I don’t really mind the idea of publishing reviews anonymously… maybe people would be more responsible.” Scholars equate transparency with fairness. Visibility into the process—without violating confidentiality—could rebuild trust across authors, reviewers, and editors alike.

Discussion and Conclusion

These interviews portray a field in tension: deeply committed to peer review’s ideals yet disillusioned with its execution. Participants see reviewing as an ethical duty, but one that has become unsustainable without structural recognition. They value rigor, but seek visibility into opaque decisions. They embrace innovation, yet fear losing legitimacy in an era of misinformation.

For Cardano and similar decentralized ecosystems, these insights highlight three design imperatives: 1) Verifiable Identity and Reputation: Use decentralized identifiers (Atala PRISM, ADA Handle) to link reviewers’ contributions to authenticated, reputation-weighted profiles. 2) Transparent Audit Trails: Store anonymized review histories on-chain, enabling accountability and recognition without breaching confidentiality. 3) Aligned Incentives: Introduce tokenized or credential-based rewards that preserve altruistic motives while acknowledging real labor.

In sum, scholars do not reject peer review—they want it to evolve. A Cardano-native system that encodes transparency, recognition, and trust can bridge traditional legitimacy with decentralized innovation. The lessons from these interviews thus form both a critique of the status quo and a blueprint for a more sustainable future of scholarly communication.