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Preprint servers and journals: Rivals or allies?

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Abstract

Purpose: This study explores the evolving role of preprint servers within the scholarly communication system, focusing on their relationship with peer-reviewed journals. As preprints become more common, questioning and understanding their future role is critical for maintaining a healthy scholarly communication ecosystem. By examining the values, concerns, and goals of preprint server managers, this study highlights the significant influence these individuals have in shaping the future of preprints.

Methodology/ Approach: A qualitative, interview-based approach was used to gather insights from preprint server managers on their roles, challenges, and visions for the future of preprints within the broader scholarly communication system.

Findings: The findings point to a lack of consensus on how preprint servers and journals should interact, and to diverging views on how the certification and curation functions are best performed, and by whom. Concerns about credibility and long-term financial sustainability are increasingly driving independent and community-run preprint servers to align more closely with journals, potentially undermining the disruptive and emancipatory potential of preprints.

Originality/value: This study is the first to examine the relationship between preprints and journals from the perspective of preprint server managers in the later stages of the COVID-19 pandemic. It sheds light on how preprint servers are navigating external pressures and market dynamics, how they are seeking to establish credibility and trust, and how, in doing so, they are reshaping the core functions of scholarly communication.

1. Introduction

Preprints have been widely used in fields such as physics, mathematics, and economics for decades, while in other fields—including psychology, biology, and medicine—their use was historically low (Puebla, Polka and Rieger, 2022). In the last decade, however, with the push for open science (OS), preprints—that is, versions of research papers that have not yet undergone peer review—have become increasingly popular (ibid.). Today, more than 50 preprint servers exist, some of which are multi-disciplinary, such as SSRN, Preprints.org, and Research Square; some of which are discipline-specific, such as arXiv, bioRxiv, and SocArXiv; and some of which are for specific regions or languages, such as AfricArXiv, Jxiv, and RINarXiv (Chaleplioglou and Koulouris, 2023). Xie *et al.* (2021) report that the number of preprints uploaded per year rose from about 3,000 in 1991 to 227,000 in 2019. Funders such as the Chan Zuckerberg Initiative, Michael J. Fox Foundation, and most recently Bill & Melinda Gates Foundation have supported this development, with some going as far as to mandate preprint use by their grantees. Building on the surge in preprinting seen during COVID-19 (Fraser *et al.*, 2021), and growing policy support for OS around the world (Mendez *et al.*, 2020; Manco, 2022) it is likely that preprint use will continue to increase in the future.

However, as preprints become more common and are distributed over a larger number of preprint servers, there is less clarity than ever about the role these unreviewed studies will play in the way researchers communicate findings or what relationship, if any, preprints and preprint servers will have with journals that peer review content in a traditional way. While some argue that preprints will not replace peer-reviewed journal articles (Irfanullah, 2021; DeMaria, 2023), others have called for precisely such a replacement (Perakakis *et al.*, 2010; Gowen, 2016; Singh Chawla, 2017). Still others envision a hybrid, "overlay" approach, in which journals would validate and curate content previously made available in preprint form (Smith, 2000; Thornton and Kroeker, 2022).

Whatever form it takes, the scholarly communication system will still need to serve its primary functions. Kircz & Roosendaal (1996) and Roosendaal & Geurts (1997) identified these functions as: "registration," "certification," "awareness," and "archiving". Registration establishes claims of precedence for a scholarly finding. Certification (or validation) determines

the validity of a scholarly claim through peer review and editorial evaluation. Awareness (or dissemination) enables actors in the scholarly system to become informed of new claims and findings. Archiving (or preservation) ensures the scholarly record remains available over time, enabling work to be cited. Roosendaal and Geurts (ibid.) also mention "recognition," the way in which scholarly outputs confer status on researchers. Because of the central role of scholarly communication in the academic "recognition" or "reputation economy" (Fecher *et al.*, 2017), others have also described "reward" or "recognition" as one of the main functions of scholarly communication in its own right (Roosendaal and Geurts, 1997; Prosser, 2005; Pinfield, 2009). A final function is "filtering" or "curation:" selecting, arranging, and endorsing content as being sufficiently relevant, robust, and important (Mukherjee, 2009; Clarke, 2016). Of these six functions—which we refer to as registration, certification, curation, dissemination, preservation, and recognition—preprint servers have traditionally performed all but two of them: certification and curation. Yet, more recently, some servers have begun to evolve in ways that are seeing them take on aspects of these functions.

If and how preprints take on the functions of certification and curation has important implications, given the prominent role that journals and journal articles play in the function and management of the research system (Wakeling *et al.*, 2018; Directorate-General for Research and Innovation *et al.*, 2019). By taking on these functions, even if partially, preprint servers would further blur the lines between preprints and journals, with the potential to disrupt aspects of academia that are considered problematic by many, including journal-centric research assessment (*San Francisco Declaration on Research Assessment*, 2012; 'The Leiden Manifesto for Research Metrics', 2015), failing and overburdened peer review system (Flaherty, 2022; Horta and Jung, 2024), and the economic models used to provide open access publishing (Budzinski *et al.*, 2020; Borrego, 2023). Developments such as these are already impacting the roles of different actors in the scholarly communication system, not least publishers, who are increasingly required to position their services in relation to preprint servers (discussed in more detail below). Other professional groups, such as library and information professionals, with their expertise in scholarly communication systems, could also play an important role in navigating these changes. They are well-positioned to facilitate the discoverability of preprints, educate researchers about their use, and support community-run servers in addressing

sustainability challenges (Farra, *et al.*, 2023). Their involvement could help ensure preprints remain accessible and integrated within the broader scholarly communication ecosystem.

As such, this paper seeks to address the following overarching question: ***What role might preprint servers play in the scholarly communication system in the future?*** We explore this question via a qualitative analysis of in-depth interviews held with 14 preprint server managers in the late stages of the COVID-19 pandemic. To the best of our knowledge, this paper is the first to focus on the perspectives of preprint server managers, unearthing their vision, values, and goals for the platforms they represent, and for preprints more broadly, as well as shedding light on the challenges preprint servers are facing as they are attempting to establish themselves as essential service providers in the scholarly communication ecosystem. The paper also highlights the broadening scope of certification and curation in scholarly communication and identifies ongoing challenges in understanding what these functions mean and how they might continue to develop in the context of preprints in particular.

2. Background and research questions

The future role of preprint servers in scholarly communication needs to be understood within the context of three important elements: a long-standing idea of "overlay" journals that is seeing a resurgence today in the form of the "Publish, Review, Curate" (PRC) model; the increasing involvement of traditional scholarly publishers in running preprint servers; and the greater focus on preprints during the COVID-19 pandemic.

2.1. Overlay journals as an alternative publishing model

Discussions on the role of preprints in relation to journal publishing date back to the very beginning of preprints. As early as 1996, arXiv founder Paul Ginsparg had already noted that academic societies and non-profit publishers might "organize high-quality peer-reviewed overlays" (Ginsparg, 1997, p. 94). Since then, this model (more commonly known now as "overlay journals") has had moderate success, primarily by relying on arXiv preprints as their source of content (Gibney, 2016; Rousi and Laakso, 2024).

In essence, this "overlay journal" model allows for a decoupling of certification and curation from the other functions of scholarly publishing (Thornton and Kroeker, 2022). Specifically, overlay journals coordinate peer review and/or editorial assessments of content that is publicly available (generally preprints) performing a function traditionally seen as the journal imprimatur: endorsing the quality of the published content (Brown, 2010). Whilst advocates of this approach use the term "journal" (Priem and Hemminger, 2012), they fundamentally reshape the concept of the "journal" as a virtual collection of certified and curated content.

Some see the decoupling of the functions of scholarly publishing from conventional journals as an opportunity to bring about disruptive change in scholarly publishing. From the outset, Ginsparg (1997) noted that commercial publishers would "probably have to learn to compete in more realistic marketplaces" because of overlays (p. 94). More recently, proponents of OS have described overlays and preprint peer review services as viable alternatives to traditional publishing (Directorate-General for Research and Innovation *et al.*, 2019; Hollister, 2021; *Overlay Journals*, 2024). Other scholars have argued that they have the potential "to form the backbone of a modern efficient and sustainable community driven publishing system" (Gilliland *et al.*, 2021, p. 8).

So far, overlay journals have had moderate success, primarily among those that rely on arXiv preprints (Gibney, 2016; Rousi and Laakso, 2024), but have not yet reached a critical mass (Ursić *et al.*, 2022). However, the influx of preprints during the early COVID-19 pandemic, coupled with concerns about the wide circulation of unvetted research reinvigorated interest in overlay journals and the PRC publishing model (Guterman, 2020; The MIT Press, 2020; Alves, 2021; Rousi and Laakso, 2024). As the number of preprints grows, so has demand for curation and evaluation services that can help organize and highlight the most pertinent, novel, and valuable scientific information.

Perhaps because overlay journals "piggyback" on existing infrastructure of preprint servers and can thus significantly reduce production costs compared to traditional journals, they are more commonly published by scientific groups rather than publishers (Rousi and Laakso, 2024). However, some traditional journal publishers have recently begun incorporating preprints into their publishing processes in various ways beyond PRC and journal overlays.

2.2. Scholarly publishers' interactions with preprint servers

Some publishers have traditionally resisted preprint growth, refusing to referee and publish outputs previously "published" elsewhere (Nallamothu and Hill, 2017). Others, however, attempted early experiments with preprints. For instance, in 2007 Springer Nature partnered with The British Library, the European Bioinformatics Institute, Science Commons, and the Wellcome Trust to launch a preprint server for the life sciences, Nature Precedings, which was shut down in 2012 due to lack of growth.

More recently, and perhaps in recognition of the potential for disruption that would be caused by a decoupling of the functions of scholarly communication, or perhaps driven by the opportunities seen in the growth of preprint adoption, commercial publishers have increasingly begun engaging with preprints (Johnson & Chiarelli, 2019), with many updating their editorial policies to explicitly allow acceptance of manuscripts previously posted as preprints (Massey *et al.*, 2020; Moshontz *et al.*, 2021) or actively encourage their use (Smart, 2022). Large commercial scholarly publishers such as Springer-Nature, Wiley, and Elsevier have acquired, invested in, or partnered with preprint platforms and services, accompanied by an—at least partial—shift in attitudes from publishers toward preprints. A number of academic societies have also launched preprint servers using commercial infrastructure. For example, the Institute of Electrical and Electronics Engineers and The American Geophysical Union operate servers (TechRxiv and ESSOAr, respectively) in partnership with Wiley, while the American Political Science Association and a collective of five chemical societies including the American Chemical Society run preprint servers (APSA Preprints and ChemRxiv, respectively) using technology from Cambridge University Press. Increasingly, these societies have also been offering direct submissions from their servers to their journals (Liemohn, 2019; APSA, 2021; *Frontiers and ChemRxiv integration now live*, 2022).

The increasing presence of publishers is pushing the development of preprints in a different direction than the overlay journals or the PRC models described above. While these latter models—operating on community-led preprint servers—are publisher neutral, publisher-led preprint servers are less well-suited to decouple the curation and certification functions. By integrating preprints into their own publishing workflows, publishers can assert control of

preprints' role in satisfying the functions of scholarly communication. Specifically, as Schonfeld and Rieger (2020) have pointed out, such integration affords publishers the opportunity to emphasize the importance and integrity of the version of record (i.e., the published version), while strengthening their hold over the research workflow as a whole—including datasets, protocols, and code. Over time, this could lead to fewer preprints living "in the wild" and more of them existing on services and within workflows that publishers control. Puebla *et al.* (2022) (have pointed out that if a few publishers consolidated ownership of preprint servers, governance and decision-making concerning server operations would largely move from scholarly communities to publishers. On the flipside, closer integration of preprint servers with publishers could arguably help drive adoption and ensure long-term sustainability of the infrastructure.

2.3. Effects of the COVID-19 pandemic

During growing publisher adoption of preprints, the onset of the COVID-19 pandemic had a profound impact on the preprint ecosystem, particularly among communities working on pandemic-relevant research (Puebla, Polka, and Rieger, 2022; Benson Marshall *et al.*, 2024). In the context of the public health emergency, the dissemination/awareness function of scholarly communication, in the form of rapid release of information, took precedence for many over the need for curation and certification (Rzayeva *et al.*, 2023; Biesenbender, Toepfer and Peters, 2024). However, as non-peer-reviewed pathways to release scientific information flourished, the absence of these functions raised concerns about harmful self-treatments and misguided public health policy decisions based on unvetted and potentially problematic research (Sheldon, 2018; Dinis-Oliveira, 2020; Kwon, 2021; West and Bergstrom, 2021).

Faced with controversy and a disruptive increase in submissions some preprint servers enhanced their usual screening procedures for COVID-19-related papers—though these interventions were ad hoc, temporary, and differed among servers (Kupferschmidt, 2020; Kwon, 2020). For example, around mid-February 2020, bioRxiv stopped accepting manuscripts discussing treatments for COVID-19 solely based on computational work and ChemRxiv started scrutinizing papers about possible COVID-19 treatments more closely (Kwon, 2020). arXiv—the oldest and largest of the preprint servers—continued posting work based on computational models (including preprints that had been turned down by bioRxiv) but hired a postdoctoral

researcher to help screen COVID-19 manuscripts (Chtena *et al.,* 2024)). That is, in light of the emergency, those managing some preprint servers felt compelled to assume, albeit carefully and partially, a role in research moderation. Other new practices spurred by the pandemic suggest a shift in some servers' willingness to also adopt a curation function. bioRxiv and medRxiv, for example, started including warning labels on COVID-19 preprints highlighting their non-peer-reviewed nature to nonscientists, including journalists and the general public, warning that "these are preliminary results that have not been peer reviewed. They should not be regarded as conclusive, guide clinical practice/health-related behavior, or be reported in news media as established information." Some servers, including arXiv, followed suit, while others avoided any intervention that could have been perceived as imparting "editorial judgment" (Chtena *et al.*, 2024). More commonly, editorial judgements of preprint quality and importance took place independent of servers themselves, through overlay preprint review initiatives like the Wellcome-funded Outbreak Science Rapid PREreview (OS*r*PRE), Mount Sinai's The Sinai Immunology Review Project, and MIT's *Rapid Reviews: COVID-19* (*RR:C19*). These initiatives emerged to help accelerate the evaluation of science reported in preprints and to address possible misinterpretations and disinformation (Johansson and Saderi, 2020; The MIT Press, 2020), joining a growing list of such efforts being led by various groups (Oliveira Henriques *et al.*, 2023). In their review, Oliveira Henriques *et al. (2023)* find that, "while almost all preprint review services [they] examined ostensibly aim to supplement the current journal-based publishing system, some also identify the possibility of more radical change" (p. 22).

2.4. Previous research on preprint servers

Several surveys have sought to better understand the potential future of preprints and preprint servers through the perspective of key stakeholders. Many of these surveys have examined researcher's perceptions of preprints (Soderberg, Errington and Nosek, 2020; Yi and Huh, 2021; Rzayeva *et al.*, 2023; Ni and Waltman, 2024) and their motivations for posting them (Fraser *et al.*, 2021; Rzayeva *et al.*, 2022; Biesenbender, Toepfer and Peters, 2024). These studies have found that researchers post preprints to encourage early discovery, immediate feedback from the scientific community, and increased citations and media coverage, but are concerned about scooping, the Ingelfinger rule (which disallows journals accepting previously published work), and quality control on preprint servers. Recent studies have also examined the

experiences and perceptions of journalists using preprints to cover COVID-19 (Massarani *et al.*, 2021; Massarani, Neves and Silva, 2021; Fleerackers *et al.*, 2022; Massarani and Neves, 2022) (Fleerackers *et al.*, 2022; Massarani *et al.*, 2021a; Massarani *et al.*, 2021b; Massarani *et al.*, 2021c; Orson, 2022), finding that, while journalists generally found preprints useful, they often lacked the expertise or time to fully understand or validate the research.

However, little is known about how preprint servers themselves are evolving, how they view their role and function in scholarly communication, and how they position themselves in relation to other players, such as journals. To the best of the authors' knowledge, only one exploratory study (Chiarelli *et al.*, 2019) has attempted to capture perspectives of preprint server staff, albeit as just one of multiple stakeholders (e.g., funders, researchers).

In the absence of research exploring attitudes, strategies, and priorities across different servers and server types, we adopted an interview study approach focused on the perspectives of those leading and managing preprint servers. To shed light on the role servers might play in the scholarly communication system, we examined three research questions:

RQ1: How do those running preprint servers understand and approach their role in the certification and curation of scientific knowledge and in relation to traditional journals?

RQ2: From the perspective of those running preprint servers, what is the most significant challenge for the uptake and long-term position of preprints in scholarly communication?

RQ3: From the perspective of those running preprint servers, how might the relationship between preprint servers and journals develop?

3. Methods

3.1. Participants and recruitment

Using a purposive sampling strategy, potential participants were identified through existing literature and through the personal networks of the authors who have had substantial involvement in the field. We adopted a social constructivist approach that assumed participants

working in diverse geographic locales and servers (e.g., in terms of discipline, business model, ownership-type) would have valuable contrasting perspectives on preprinting, which could help us understand the evolving landscape of preprints (Table 1). Our final sample consists of 14 participants representing 13 preprint servers on three continents (Table 2, Appendix).

Table 1. Characteristics of preprint servers studied.

	Server	Year Est.	Country	Discipline	Provider	Rationale
1.	AfricArXiv	2018	Pan-African	Multi-disciplinary	UbuntuNet Alliance	Geographic diversity
2.	arXiv	1991	US	Mathematics, information science, quantitative biology, quantitative finance, electrical engineering and systems, science, physics, and economics	Cornell University	Historical; discipline(s) specific
3.	bioRxiv	2013	US	Biology and life science/Clinical research	Cold Spring Harbor Laboratory	Run by research institution; discipline specific; sensitive topics
4.	ChemRxiv	2017	US	Chemistry	Five chemistry societies	Run by society publishers; discipline specific
5.	EarthArXiv	2017	US	Earth science	California Digital Library	Community run; university based; discipline specific
6.	Jxiv	2022	JPN	Multi-disciplinary	Japan Science and	Geographic diversity; community run

					Technology Agency (JST)	on government infrastructure
7.	MediArXiv	2019	US	Media, film, and communication studies	Center for Open Science	Community run; discipline specific
8.	medRxiv	2019	US	Biology and life science/ Clinical research	Cold Spring Harbor Laboratory	Run by research institution; discipline specific; sensitive topics
9.	Research Square	2013	US	Multi-disciplinary	Springer Nature	Run by commercial publisher
10.	RINarxiv	2017	ID	Multi-disciplinary	BRIN Indonesia	Geographic diversity; community run
11.	SciELO Preprints	2020	BR	Multi-disciplinary	SciELO Network	Geographic diversity; run by publishing co-op
12.	SocArXiv	2016	US	Social and behavioral sciences	University of Maryland Library	Community run; discipline specific
13.	SSRN	1994	US	Multi-disciplinary	Elsevier	Run by commercial publisher; historical

3.2. Data Collection

Two authors (NC and IP) conducted semi-structured interviews with all the participants. An interview guide was drafted by the authors and revised following the first three interviews, after which it remained mostly unchanged. Participants were asked about their server's mission and goals, service offerings and partnerships, operational challenges, and outlook and future directions. Participants were also asked about screening/quality control and content management

policies and practices, the rationales underlying them, and the impact of the COVID-19 pandemic on operations and services. Our interview guide is available at: https://osf.io/drtj6/

Interviews lasted approximately one hour each and were conducted and audio recorded on Zoom. Interviewers wrote notes after each interview, summarizing key points, highlighting connections among interviews, and engaging in reflexivity around the interview itself. Both principles of saturation (Hennink and Kaiser, 2022) and information power (Malterud, Siersma and Guassora, 2021) were used to determine our sample size with data collection stopping once no more participants fulfilling our inclusion criteria could be identified and once meaning and content saturation was reached as assessed during the interviews.

Data collection took place from February–April 2023. The study was approved by the Simon Fraser University Research Ethics Committee (#30001471). Participants could choose to remain anonymous or be named in any publications related to the interviews. All participants chose to have their names used; however, three opted not to have their names associated with specific quotes. We report our results in line with participants' wishes, using codes for participants who opted not to have individual quotations linked to them by name (i.e., P01, P02, P03).

While participants were assured that there were no preferred answers and that the study sought candid perspectives, we acknowledge the possibility that the decision to be named might have influenced their responses, as concerns about professional image or reputation could have led some participants to moderate their views. To address this, we applied a critical lens in analyzing the data, considering not only what participants said but also the underlying motivations, perspectives, or biases that might not have been explicitly expressed.

3.3. Data Analysis

All interviews were transcribed verbatim and analyzed using codebook thematic analysis (Braun and Clarke, 2023). During transcription preliminary codes were noted down. Following a process of familiarization with the entire dataset, a coding framework was developed by the first author, then discussed with the other authors and finalized. We used a hybrid approach towards the development of the coding scheme encompassing a largely inductive framework with the

inclusion of some conceptual constructs drawn from the literature (e.g., A. Chiarelli *et al.* 2019; Puebla, Polka, and Rieger 2022; Roosendaal and Geurts 1997). All data was then coded in NVivo 12 by NC. To fine-tune categories, additional coding was done using a separate coding matrix created in Excel (Rosen *et al.*, 2023). Preliminary themes were discussed among authors and then refined using a combination of further coding and sketching out relationships by hand on paper, in an iterative process of coding, code organization, analysis, and writing. Results were shared with all authors for feedback before finalization. Our final codebook is available at: https://osf.io/drtj6/

4. Findings

4.1. Preprint servers and journals

When participants were asked to forecast the future of preprints, and preprint servers, most participants expressed skepticism that the spike in preprinting observed during the early pandemic would continue. Some participants also expressed disappointment that the pandemic did not move the needle for preprints as much as they had hoped, suggesting that driving adoption remains a key challenge—particularly in fields with historically low uptakes and in regions outside Europe and North America.

Notably, participants often—and without being prompted—framed the future of preprint servers in relation to journals. Representatives from servers including bioRxiv/medRxiv, SciELO, and EarthArXiv envisioned a future that involves some decoupling of scholarly communication functions, with preprint servers being responsible for registration and dissemination and journals for certification and curation:

> The role that preprints can have in the scholarly publishing kind of workflow is really that separation of the dissemination of the research from the curation of the research. So, the dissemination aspect would be the role of the preprint servers—getting the work out there as fast as possible, getting community input and feedback to try and improve the work. And then you could imagine a model, like a marketplace kind of idea, where the journal editors are then coming to the preprint servers, finding the manuscripts and the

research that they're interested in, and then they solicit submissions from the authors. (John Inglis, co-founder & PI, bioRxiv and medRxiv)

At the same time, several participants mentioned an increasing "blurring of boundaries" between preprint servers and journals and preprints and journal articles. We noted that this sentiment appeared to be more common among participants representing servers with ties to publishers or publishing services organizations (e.g., Research Square, SciELO, SSRN), or servers with journal integration services (e.g., bioRxiv, ChemRxiv, medRxiv), although our qualitative approach did not allow us to systematically compare participant responses. These blurring boundaries were brought up by participants in relation to preprint review, journal integration services, and the future role of preprint servers and journals more broadly. Alex Mendonça, Online Submission and Preprints Coordinator at SciELO, placed preprints firmly within existing publishing structures and described how preprint comments and assessments can be used by journal editors as they shepherd manuscripts through their own peer review pipeline:

> For us, journal articles and preprints are getting more and more intertwined. Sometimes the preprint goes along the journal article, so they are running side-by-side…So that means that as a preprint is posted and people are reading and maybe commenting and maybe reviewing the preprint, the journal can be doing peer review at the same time and using those comments, using those reviews, for the journal peer review…So that's why, for SciELO, preprints and journals articles... I don't want to say that they are the same, but they're very much connected.

As illustrated by Mendonça's statement, most participants stated that preprints would continue to enhance rather than disrupt established scholarly communication practices, although a few of them suggested that preprints would gradually destabilize the value and centrality of the published journal article as the "version of record." For example, citing the formidable cost of article-processing charges (APCs) for open-access journal articles as a driving factor, Research Square's VP of Product and Publishing at the time of data collection, Amye Kenall, projected that preprint servers would become the "final destination" for an increasing number of authors:

Soon you'll get to a point where people are willing to put far more content out on preprint servers, and that's just where that content lives. That's its – end of its journey. And maybe you'll just put a few key pieces of your work in journals. I see that as highly likely. Because as that line gets blurrier and blurrier, and an open access fee is something like $2,000 versus free or a light – very light fee, it's hard to justify going to pay a $2,000 fee.

Participants overall remained more skeptical, however, noting that for preprints to become the version of record, significant changes would need to occur to academic incentive, reward, and funding structures. Participants also made frequent reference to the "stamp of credibility" that publication in a reputable journal offers (i.e., their recognition function), suggesting that authors are drawn to the prestige that "brand-name" journals impart on their own work. This led some to conclude that "there is always going to be some extra step" (P03) beyond posting a preprint, be it journal publication or a certification and curation "layer" on top of the preprint—though a lack of consensus emerged in terms of what this layer could or should look like, as further discussed below (section 4.4.).

While some participants openly discussed their desire for preprint servers to partially or completely displace journals, there was a shared sense of skepticism that this vision would, or could, become a reality—in large part due to how academic culture and incentives perpetuate traditional publishing structures. For example, Jeff Pooley, co-founder of MediArXiv and Steering Committee Member at SocArXiv, mentioned his desire for preprints to destabilize commercial publishers but doubted that preprint review initiatives could "replac[e] traditional editorial gatekeeping." For others, the goal was not replacement but symbiosis or strategic integration aimed at "altering the dynamics of the processes that are applied to newly released research results" (John Inglis, bioRxiv/medRxiv).

Such an "ally" strategy appears to be driven more by pragmatism than ideology, underpinned by a desire to provide a service that is of value to as broad a spectrum of users-researchers as possible and that helps push OS toward a sustainable future. For instance, Inglis noted that bioRxiv's founding team pragmatically decided that bioRxiv "would be much more likely to succeed" if it were integrated into current scholarly communication practices rather than

attempted to subvert them setting it up as an alternative: "We were convinced that if we adopted the attitude that preprints were going to be a substitute for journals, we'd get nowhere. It had been tried before and failed several, several times."

One of bioRxiv's core strategies for encouraging such integration—one later adopted by other servers—was to create automated submission pathways from server to journal, and vice versa. Participants explained that these pathways meet authors were they are and reduce the barrier to entry for preprints:

> Most preprint platforms, you go to before you go to a journal. It's one more thing that you do, one more job on your to-do list. And it's very separate; it's not synced with what's going on in the journal submission or publication pipeline. Research Square is almost more of a journal service… a way for authors to share their work early and demonstrate where it is in the peer review pipeline. (Amye Kenall, Research Square).

According to participants, pathways to and from journals also lend credibility and provide a needed stamp of approval to preprints in an environment where many still view them apprehensively. Arguably, this is a perspective where the certification and curation functions performed by journals endorse the registration and dissemination functions already provided by preprint servers. Speaking of medRxiv's Direct Transfer from medRxiv to Journals (M2J), the server's representatives mentioned that partnering with journals—and having their official support—signals to the medical research community that the work medRxiv does is in service of science and that, by trusting the server to put their work out early, authors will not be put in harm's way. Co-founder of EarthArXiv, Bruce Caron, similarly framed the server's partnership with the open access publisher PLOS as providing "a little bit of legitimation."

Arrangements between servers and journals such as those described above begin to resemble the overlay journal model proposed decades ago, with implications for the financial sustainability of scholarly communication. As Caron noted, "if you do more of an overlay journal in your society, you can save a lot of money and get people more engaged."

4.2. Sustainability and commercial interests

While the overlay model approach offered hope for some participants, the growing role of for-profit publishers in the preprint space also caused concern, especially among those representing community-led and/or community-supported servers. MediArXiv Co-founder, Jeff Pooley, identified specific ways in which large, for-profit publishers could exploit preprints and their users, including mining preprints for data, upselling editorial services—some of which are AI-based—and taking advantage of non-English speakers. More broadly, he expressed worry that scholarly communities are increasingly abdicating control of their intellectual property, data, and, even, values to for-profit companies. Pooley's concerns were echoed by SocArXiv's Founding Director Philip Cohen, who warned against the damage publishing monopolies could inflict on the preprint ecosystem by driving up prices, dampening innovation, and hampering researcher choice:

> Publishers probably will take over preprints. They'll probably win because they usually win. They're much bigger than us. They can build things that are bigger and more beautiful and work better, and like Amazon, they can put something up that's really cheap or free to use until their competition dies, and then they can charge more for it later if they want to.

Cohen's statement speaks to the precarity of non-commercial preprint infrastructure and the broader vulnerability of the research lifecycle to commercial exploitation. Cohen's concerns were echoed by representatives from community-led servers such as arXiv and EarthArXiv, who underscored the importance of publishing infrastructures remaining academy-owned—that is, controlled and governed by academic institutions rather than the marketplace.

Such questions of ownership and control were frequently interwoven with discussions about sustainability-related issues such as market competition and diversification, user uptake and acceptance, and credibility and trust in preprint servers. For example, Head of Content & User Support at arXiv, Jim Entwood, alluded to the importance of service diversification for preprint servers to compete successfully in an increasingly challenging business environment—particularly as publisher integration becomes more common. He noted that the "push component" of arXiv's services sets it apart from the competition: "arXiv is pushing out those e-

mails to the researchers in the field who subscribe to them, and there's an extra value there that I'm not sure many of these other services have or have an interest in doing."

Participants also noted that sustainability-related concerns may discourage preprint server use, as may be wary of services that come and go, and reluctant to spend time and effort on entities that might not be around for long.

4.3. Trust in preprints

Beyond questions of sustainability and uncertainty about the role of commercial actors, participants saw trust-related issues as the most significant challenge for the uptake and long-term position of preprints. They discussed trust in relation to content governance, distribution, curation, and evaluation, and servers' current service offerings (see Table 3 in Appendix).

While all but one participants were emphatic about not performing any kind of "value judgment" on content, several underscored the importance of adequate and transparent quality control and moderation checks for building trust in preprints and preprint servers. For instance, AfricArxiv's Head of Submissions Moderation, Nicholas Outa, reflected:

> I think one of the reasons people don't trust preprint servers is, they think that you can publish any junk work there. "They're not going to do peer review, so let me just, you know, throw in anything there and it will be published." So one of the most important things is to put very strict measures in place and also to just make sure that preprint servers comply with responsible research ethics practices.

Participants such as SciELO's Alex Mendonça described using multiple levels of moderation to build credibility in their brand and in preprints more broadly. Mendonça described moderation as providing heuristic cues analogous to a journal's selection and peer review processes:

> We have a lot of moderation steps… we don't want to contribute to the bad reputation that preprints have of being low quality research or having less quality than the research published in a journal…That's why we have those extra moderation steps, to give a little

more, let's say, credibility or trust [in the content we post]... and we are definitely concerned about SciELO's own reputation as well.

At the same time, participants acknowledged that overly robust screening and/or moderation processes may backfire, either by undermining the value proposition of preprints or by positioning servers in competition with peer-reviewed journals:

> If you put in too [many] restrictions, then sometimes people would start saying "Then what's the difference between this and any other conventional journal? I would rather just submit it elsewhere and wait through the process [...]". So we don't want to be prohibitive [either]. (Nicholas Outa, AfricArXiv)

Other participants rejected the notion of moderation as a credibility cue, especially those representing servers that identify more as digital archives than preprint servers, per se. Cohen, for example, argued: "The fact that a paper is on SocArXiv does not mean it is true and/or important. It's not an accomplishment to post a paper on SocArXiv."

Perspectives also varied on the value or importance of providing trust and credibility signals at the dissemination stage—something clearly observed in the metadata and metrics different services choose to present alongside preprints. For example, arXiv does not display authors' institutions, verified identity markers (e.g., ORCiD), or any usage metrics. In contrast, SSRN is strongly invested in metricization, displaying not just views, download, and citation count information about papers, but also author-level productivity and impact metrics. Such metrics are similar to those historically championed by mega-journals with "soundness only" peer-review as means of letting "the community decide" the value of a published article (Spezi *et al.*, 2018). bioRxiv and medRxiv not only display engagement and impact metrics but also take a context-building approach by providing links to scientific discussion (e.g., comments, Tweets) and evaluation of preprints (e.g., community peer reviews). In this model, extrinsic trust cues are outsourced, produced from multiple sources, and ever evolving in a bricolage-type configuration that differs from the centralized, sequential, and bound nature of journal peer review, but which performs aspects of the validation and curation functions in new ways.

Participants also highlighted the importance of indicators such as funding, conflict of interest, and data availability statements, as well as links to study data. Some expressed exasperation that these transparency practices are not more normalized across disciplines and many mentioned encouraging authors to share such information (e.g., via submissions guidelines or through direct interactions with submitting authors), particularly in the context of COVID-19 and other public-health-related research. Yet, except for a handful of cases, these attitudes had not yet translated into policies requiring such information on submission, perhaps due to concerns about raising the barrier to entry and, in turn, driving down preprint adoption.

Interestingly, participants did not mention preprint withdrawal policies—the equivalent of journal retraction policies—as trust and/or credibility markers. For journals, robust retraction policies are thought to minimize instances of fraud or misconduct and help maintain the integrity of the journal and the broader scholarly record (Atlas, 2004). Yet, while many servers have robust policies for author-initiated withdrawals, detailed and transparent server-initiated withdrawal policies are far less common (Teixeira da Silva, 2021). When prompted to discuss the reasons for abstaining from developing such policies, participants either downplayed their necessity ("I think we're waiting for a policy to emerge once we have a case to work with") or implied such policies veer too strongly into editorial judgements, which most servers actively resist. Here we see preprint server providers managing a tension of enhancing trust in their content without performing, or being seen to perform, peer review. Different servers manage this tension in different ways, but all clearly recognize its existence, particularly in the aftermath of the pandemic.

4.4. An emerging value regime

Many participants mentioned the increasing importance of helping readers "vet" or "filter" preprint content, although there were differences on how to support such value judgements and where the responsibility for providing this function should lie. To support this goal, participants felt new indicators of quality and credibility were needed, especially in the context of generative AI, information overload, and mis- and disinformation problems. The need for such indicators was more frequently expressed among participants running publisher-owned or publisher-adjacent servers, as well as those who think of themselves more as publishers than

archives. Importantly, when prompted, participants largely rejected the notion that such quality and credibility indicators or metrics could end up replicating the Journal Impact Factor and its well-documented problems (Chawla, 2018; Paulus, Cruz and Krach, 2018). Some, however, were explicitly critical, warning of unintended consequences of developing such trust and quality metrics.

Few participants went into detail in terms of the criteria upon which a preprint's quality and value should be judged. Amongst them was Mendonça, who described a web of criteria arranged along numerous dimensions, including data availability and quality, openness about author contributions, independent endorsement, and server reputation. He noted: "I don't know if it's going to be one single indicator. Maybe there will be, and maybe it will be just as problematic as the impact factor. Hopefully not." Mendonça further suggested that journals will likely play a key role in preprint assessment—as curators selecting the preprints they deem as most valuable and high-quality, and as "compliance officers" assessing how well preprints conform to OS principles and best practices.

As alluded to above, servers overwhelmingly look to outside parties to provide trust and quality signals on preprints. This may be because they lack the resources to assess content beyond the pre-posting quality assurance checks they already perform, which typically focus on issues such as completeness, plagiarism detection, and author verification (Chtena *et al.*, 2024). A notable exception is Research Square, which offers research integrity badges as an opt-in service that authors can purchase to signal to readers that they have upheld research integrity standards:

> As [the use of] AI increases, there will be a need for another layer on top of preprints that does a level of validation, but for that to be not necessarily something that every single preprint has. I have no idea what eventual form this will take... So we're talking very abstractly… [But] people will need some way to understand if research can be trusted, if they can build on it, etc. (Amye Kenall, VP of Product and Publishing)

The platform offers two types of badges: a Methods Reporting Badge and a Data Reporting Badge, which each costs $100 USD. These badges are issued following a review of preprints by

Research Square's editorial staff, and are specifically focused on quality of reporting, not quality of the study design, implementation, or analysis (i.e., aspects typically assessed during peer review). Such badging of the soundness of the research is apparently pushing in the direction of certification and curation functions.

Instead of offering direct services, bioRxiv server offers a delivery pipeline, B2X, which enables authors to send their manuscripts to a variety of third-party services—completely independent of bioRxiv—that assess particular aspects of manuscripts or check for compliance with specific funder requirements (e.g., FAIR data). SciELO and Center for Open Science (COS)-backed servers (e.g., SocArXiv, MediArXiv, AfricArxiv) are experimenting with "lightweight" endorsements from the academic community. These servers use a plugin called Plaudit, which was developed to provide a transparent, journal- and publisher-agnostic signal about the quality of an academic work that could, potentially, serve as a complement to other forms of formal and informal review. According to Cohen, tools like Plaudit could also be used to address the problem of disinformation. He noted that attempting to block "bad research" from getting out—e.g., by introducing stricter screening criteria—was not feasible or realistic for his team. Instead, endorsements or annotations by researchers could help provide context and add a layer of trust to content.

Additionally, some servers are experimenting with preprint peer review integration—that is, ways to display either journal or community reviews of preprints (e.g., PREreview, Peer Review In) on preprint article landing pages. Among the strongest proponents of this model are the team behind bioRxiv and medRxiv, who, according to Inglis, had been interested in preprint review since the early days of bioRxiv but opted to put the idea on ice until the server became more established:

> We had that idea very, very close to the beginning of bioRxiv, but it wasn't the time to go around promoting that because authors would not benefit from our undermining the confidence of the journal publishing system that we were attempting to add something rather than undermine something.

Yet, Inglis suggested that he could see the tide as slowly shifting, with interest in preprint review and its potential growing at a slow, but steady rate:

> …we're seeing the beginnings of this sort of transformation. It's slow, it's going to take a while, there aren't viable business models at this point for any of these things. But the idea is beginning to catch on that there is value in preprints and the assessment of them, and that can add to the evolution of scholarly discourse and communication.

Other participants, while supportive of preprint review in principle, raised questions about the lack of incentives and rewards for researchers to perform such assessments. As Mendonça noted, "People don't wake up and go, 'Oh I will review a preprint today.' They don't do that. There are not enough incentives… giving more credit, recognizing the importance of reviewing preprints [is essential]." A few participants, including SocArXiv's Philip Cohen, further mentioned that preprint review has both a "collective action" problem and a market competition one, with journals being seen as controlling the modern peer review process:

> As far as retooling our whole system to build review around preprints, you really have to solve the journal problem before that's going to take off. In other words, journals have a monopoly on the process also. It's not just the corporate journals and their economic monopoly. It's the concept of the version of record and journal peer review as the standard of peer review—it's like a cultural, or cognitive, or institutional structure that we have to figure out how to get out from under.

Similarly, Pooley, expressed concern over the ways in which value may be operationalized in preprint assessment to emphasize "likes" and other metrics of popularity:

> In theory, it would be wonderful…[But] I'm a little skeptical of it in practice [because] I think it's subject to gaming behaviors and I think some of the same almost social-media-like leaderboard style exercising could happen whereby views stands in as a proxy for quality in the open peer review piece.

5. Discussion

While preprints have gained ground in recent years, where exactly they fit in the scholarly communication landscape and in relation to other stakeholders—in particular, journals—is still being negotiated. With the launch of direct server-to-journal pipelines like biorXiv's B2J (bioRxiv-to-journal), new overlay journals like MIT Press's *Rapid Reviews: Infectious Diseases* (formerly known as *Rapid Reviews: COVID-19*), and journal services like Springer Nature's "In Review," which publicly link preprint manuscripts to the journals reviewing them, the distance between preprints and traditional journal publishing has arguably begun to narrow. As this study illustrates, the fragmented and evolving nature of these relationships underscores the ongoing uncertainty about how preprint servers define their roles and connections with journals.

Our findings reveal that preprint server managers hold diverging views on their roles in the certification and curation of scientific knowledge. Some participants emphasized the importance of aligning with journals to enhance trust and adoption, seeing this as a pragmatic way to address demands for credibility. Others, however, prioritized maintaining independence, arguing that preprints should remain distinct from traditional publishing structures to preserve their openness and flexibility. While consensus may not be possible (or even desirable), there appears to be a tension between the visions of those whose servers are closely aligned with journal publishers and those who are operating more as community repositories. This tension is largely, but not entirely, between commercially run and community-run servers, although demarcation lines are not always clear. These perspectives reflect broader challenges in defining a clear and consistent role for preprints in a system still dominated by traditional journal norms.

The tension between these visions becomes apparent when considering different potential paths toward preprint adoption. Keeping preprint servers and journals separate requires preprinting to be author-driven, while a closer coupling allows publishers to prompt or even manage preprints as part of journal submission workflows. The former likely means preprint uptake will be slower and patchier across the system but will also see genuine author buy-in along the way. Such an approach leaves the door open for the scholarly community to find value in preprints as a form of scholarly communication that is separate from the curation and

certification functions found in journals, as well as separate from existing academic reward and incentive structures that are centered around publication in said journals. Further, maintaining separation between the two would allow researchers to selectively opt out of paywalled and/or APC-based publishing while continuing to make their content open access (Vianello, 2021). Conversely, closer integration of preprints into journal workflows could lead to more rapid and widespread adoption,boosting sustainability (Russell *et al.*, 2021; Ni and Waltman, 2024) but likely crystalizing preprints as subordinate to journals (Vianello, 2021). Integration also raises practical concerns, such as ambiguity over the status of preprints rejected by journals that own the preprint server.

These potential paths toward integration highlight the range of approaches that preprint servers might adopt. At one extreme, publishers may own and directly control preprint servers, as in the case of Research Square, owned by Springer Nature. This level of integration enables alignment at technical, procedural, and governance levels, but also risks preprints being subsumed within journal operations. Alternatively, publishers may facilitate use of independent preprint servers, as in the case of PLOS, which encourages authors to post preprints on bioRxiv or medRxiv as part of its submission process. Here, the publisher and preprint server remain separate entities, reflecting a more cooperation-based integration. These divergent models underscore the complexity of balancing the independence of preprints with the practical benefits of closer integration.

Regardless of how each participant envisioned the relationship between their server and journals in the long term, the everyday challenges of driving uptake and remaining sustainable often override idealism. That is, pragmatism seems to be shaping activity around complementing rather than competing with existing providers in the scholarly communication system, at least in the short term. Many participants expressed concerns that pushing for radical change too early could alienate their communities and undermine the credibility and success of preprints and preprint servers. As a result, more preprint servers are experimenting with ways to integrate into journal infrastructures and workflows, even when their long-term visions emphasize separation. This strategy may ultimately prove counterproductive for community-run servers, as the impetus to make preprint posting and updating more seamless for authors is leading publishers to create their own, competing preprint services that can achieve an integration more easily, either through

acquisition or internal development. Examples include Elsevier's acquisition of SSRN, Wiley's acquisition of Authorea and launch of "Under Review", and Springer Nature's acquisition of Research Square (Schonfeld and Rieger, 2020).

Our interviews reveal that maintaining preprint servers as separate from journals is challenging, especially at a time when concerns about the credibility of science and its impact on public trust are widespread (Kennedy and Tyson, 2023; Kavouras, 2024). Current attitudes (and skepticism) towards preprints—both within and outside academia (Rogers, 2020; Soderberg, Errington and Nosek, 2020)—have made servers preoccupied with engendering trust in preprints in the absence of peer review. While all servers emphasized that they do not want to handle traditional full-scale certification and curation functions, many expressed a desire for these functions to be fulfilled in some way to continue driving the use of preprints. This has pushed some of them towards providing these functions in a limited way, either directly or indirectly, by aggregating and incorporating community feedback (e.g., annotations, external peer review) and engagement metrics, or by associating with and leaning on the trust placed in journals. In doing so, each server, with its own vision and approach, is redefining the concepts of certification and curation.

There are implications of these additional demands for credibility and accountability placed on preprint servers. Perhaps most consequentially, the demands are likely to drive up the cost of running preprint servers, which could especially hurt community-run servers and those lacking large scale funding. At present, preprints are very low-cost, but as expectations of servers grow, so will operational costs and pressures to charge fees or otherwise generate revenue. While most participants rejected the notion that something similar to APCs would develop for preprints, some predicted the future would bring a marketplace of options, in which authors would be able to choose between different levels and/or types of certification and curation—some free and provided by the community, others provided by commercial actors. The need to generate revenue to cover additional services could drive out non-profit providers who may find themselves unable to compete with the ability of commercial providers to cross-subsidize and invest in the services they offer.

Research funders are also bound to influence how these developments play out, with their ability to not just impact the volume of preprints posted and processed (Sever, Eisen and Inglis, 2019), but also—depending on their policies—accelerate the move towards certain models of certification and curation (Chan Zuckerberg Initiative Science, 2020; Nash, 2024). Though many funders have been reluctant to mandate preprinting, the new Gates OA policy (*2025 Open Access Policy*, no date) and current cOAlition S draft policy consultation (Stern *et al.*, 2023) may mark a new era of preprint mandates. These new policies are accelerating the move toward "verified" or "certified" preprints, regardless of where servers were otherwise heading.

Such policies could further move the PRC model, or other types of journal overlays, from the niche to the mainstream. In these policies, funders may inadvertently be drawing the line between preprints and journals, with preprint servers playing a central function as disseminators (or publishers) and a complementary one as curators. While there is no settled idea of what constitutes an overlay journal, it is generally envisioned that the curation function would be performed by the academic community. That is, preprints servers in an overlay scenario are components in a community-led infrastructure that collectively performs the functions currently carried out in a bundled form by journals. Such a model necessarily involves preprint servers themselves remaining community-led, or at least that overlay journals be independent of the servers they are drawing from. However, it is not clear where the investment required for preprint verification systems, preprint review initiatives, or other types of overlays would come from.

In sum, this study highlights the diverse ways in which preprint server managers approach their roles, the challenges they face, and the potential paths for the development of preprints in scholarly communication. The decisions servers make about their governance, integration, and certification practices will not only shape their sustainability but also influence the broader expectations of what preprints are and should become. While there is no single vision dominating the landscape, the choices made now will have lasting implications for the balance between openness, credibility, and independence in the preprint ecosystem. These decisions should not be taken lightly.

6. Limitations and future directions

This study reflects the state of preprint servers and their perspectives during February–April 2023. As the preprint ecosystem continues to evolve, particularly in response to ongoing policy changes and technological advancements, some findings may become less applicable over time.

Additionally, while this study employed a purposive sampling strategy to ensure diversity across geographic regions, disciplines, and business models, certain regions or disciplines with emerging or nascent preprint adoption may still be underrepresented. Despite these limitations, the diversity of the sample—14 participants representing 13 preprint servers across three continents—provides a robust foundation for examining key trends and challenges in the preprint ecosystem. Finally, participants chose to take part in the study when invited, which may have introduced a bias toward those more engaged with the challenges or future directions of preprints. The perspectives of those who declined to participate may offer additional nuances not captured here.

Although the data provide rich insights into how managers perceive their roles, the study is limited to their perspectives. Other stakeholders, such as funders, journal editors, or policymakers may have different or complementary views that could further contextualize the findings. In particular, the perspectives of journal editors—whose decisions significantly influence the relationship between preprint servers and journals—are not captured here. Future research incorporating these viewpoints would provide a deeper understanding of the systemic barriers and opportunities for preprint adoption. Another important area for exploration is the long-term impact of increased journal integration with preprint servers, particularly regarding the potential for preprints to challenge or reinforce traditional scholarly communication hierarchies. Additionally, studies could investigate how evolving policies, such as funder mandates, influence preprint server operations, governance, and community perceptions. Longitudinal studies tracking how preprint practices evolve over time across diverse contexts would also provide valuable insights into their sustainability and potential to disrupt traditional publishing models. Finally, the role of emerging technologies, such as artificial intelligence in preprint curation and dissemination, is a critical avenue for future research. Understanding how these technologies

may shape preprint practices, trust, and accessibility will be key to navigating their integration responsibly.

In terms of implications for practice, our findings caution against overemphasizing credibility measures that mimic traditional journal practices, as these may undermine the disruptive potential of preprints. Instead, we suggest focusing on practices that reinforce preprints' role as a distinct, open, and flexible form of scholarly communication. Funders and policymakers should be mindful of the trade-offs between enhancing trust and preserving the accessibility and independence of preprint platforms. Libraries and information professionals, with their expertise in scholarly communication and open access, could contribute by supporting community-run servers, fostering collaborations between stakeholders, and advocating for preprints as valuable outputs in scholarly recognition systems. By leveraging their expertise, libraries can help ensure that preprints remain accessible, open, and sustainable within a rapidly evolving scholarly communication ecosystem.

7. Acknowledgements

8. Funding Statement

9. References

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APPENDIX

Table 2. List of interview participants.

	Interview Date	**Name**	**Title & Position**	**Preprint Server**
1.	February 21, 2023	Nicholas Outa[1]	Head of Submissions Moderation	AfricArXiv
2.	February 10, 2023	Ben Mudrak	Senior Product Manager	ChemRxiv
3.	February 13, 2023	Bruce Caron	Co-founder	EarthArXiv
4.	February 20, 2023	Dasapta Erwin Irawan	Manager	RINarxiv
5.	February 28, 2023	John Inglis	Co-founder & PI	bioRxiv/ medRxiv
6.	February 28, 2023	Samantha Hindle	Content Manager	bioRxiv/ medRxiv
7.	March 2, 2023	Jeff Pooley	Co-founder & Co-lead for MediArXiv (and Member of SocArXiv's Steering Committee)	MediArXiv/ SocArXiv
8.	March 8, 2023	Alex Mendonça	Online Submission & Preprints Coordinator	SciELO
9.	March 24, 2023	Soichi Kubota	Manager	Jxiv
10.	March 27, 2023	Jim Entwood	Head of Content & User Support	arXiv
11.	March 31, 2023	Gregg Gordon	Managing Director	SSRN
12.	April 3, 2023	Philip Cohen	Founding Director	SocArXiv
13.	April 13, 2023	Amye Kenall[2]	Vice President, Product and Publishing	Research Square
14.	April 21, 2023	Roma Konecky	Associate Product Manager	Research Square

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[1] Outa oversaw AricArXiv's moderation process at the time of data collection. As of this writing, AfricArXiv's moderation process is overseen by Martha Chikuni, Content Manager at UbuntuNet Alliance.
[2] Kenall was Research Square's VP of Product and Publishing at the time of data collection. She is currently VP of Product, Data & Analytics Hub at Digital Science.

Table 3. Services and capabilities for "light" certification and curation currently offered by preprint servers.

	Journal integration	Preprint review integration	Commenting	Impact metrics	Digital badges	Endorsement (Plaudit)	Preprint Citation Index
AfricArXiv	(in dev.)			X			
arXiv	X						X
bioRxiv	X	X	X	X			X
ChemRxiv	X		X	X			X
EarthArXiv	X		X				
Jxiv	(in dev.)			X			
MediArXiv			X	X		X	
medRxiv	X	X	X	X			X
Research Square	X		X	X	X		
RINarxiv							
SciELO Preprints Collection	X	X	X	X		X	
SocArXiv			X	X		X	
SSRN	X			X			