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Journalism as Science's Watchdog: The Vibrancy and Vulnerability of an Increasingly Diverse Ecosystem

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Abstract

Watchdog science journalism, broadly understood, investigates, exposes, and warns society of the misuses and abuses of science methods, processes, outcomes, and authority by those practicing, funding, and/or using science in the public domain. Amid rising threats to research integrity, this thematic issue provides a first comprehensive set of empirical and conceptual insights into how this type of journalism is becoming both vibrant and vulnerable. It reveals that watchdog science journalism is recognized as essential by members of the public and by journalists alike and is empowered by an increasingly diverse set of actors, both within and beyond traditional journalism. Yet, ongoing challenges within and beyond the news industry are putting pressure on this role, undermining journalists' capacity to effectively scrutinize and sound the alarm about research integrity problems that put the public interest at risk.

Keywords

investigative journalism; research fraud; research integrity; science journalism; watchdog journalism

1. Introduction

Science is one of the best systems we have for understanding an increasingly messy world. Guided by norms such as disinterestedness and organized skepticism (Merton, 1973), science strives to provide evidence that is as unbiased, reliable, and accurate as possible. For good reasons, scientists remain one of the most trusted groups of people worldwide (Ipsos, 2025), despite growing anti-science sentiment and “post-truth” thinking. Science journalists frequently lean on scientists, often by default, to provide expert context, critique, and

verification for their stories. This provides a much-needed evidence-based perspective that can help audiences make informed decisions amid a wealth of conflicting perspectives, vested interests, misinformation, and polarizing claims.

Yet simply “trusting the science” can also be damaging. In an increasingly competitive, metrics-driven academic research culture, and with the intensification of political and corporate interests in the science enterprise, plagiarism, fabrication, falsification, citation cartels, and questionable research practices have become more noticeable. This list of threats to research integrity seems to only be growing as new developments—such as LLM-driven peer review, papermills, and predatory publishing—add pressure to an already overstressed scholarly ecosystem. Every year, thousands of papers are deemed so problematic that they are retracted from the scientific record (Van Noorden, 2023), while many more linger on, their flaws undetected and uncorrected.

Although problematic research represents a very small proportion of the literature (Van Noorden, 2023), its impacts can be far-reaching. Faulty science often makes headlines (Bolland et al., 2022) and leads to misleading news coverage that is seldom corrected, even after a paper is retracted (Valinciute & Halfman, 2025). Such coverage can lead audiences to misevaluate science-related risks and benefits (Sarathchandra & McCright, 2017), make decisions on inaccurate evidence, and potentially lose trust in science (Ophir & Jamieson, 2021). Flawed science can also shape public policy (Malkov et al., 2023) and professional practices (Candal-Pedreira & Ruano-Ravina, 2025), sometimes with disastrous consequences. In one high-profile case, an estimated 800,000 deaths could have been avoided had medical guidelines not been grounded in fabricated research (Piper, 2024).

Clearly, if the primary duty of journalism is to protect the public interest, the above threats call on science journalists to make holding science accountable a core professional responsibility. Just as political reporters scrutinize powerful actors, science journalists have a duty to keep a critical eye on science, acting as “watchdogs” of harmful practices in the science sphere. However, research suggests that although science journalists see criticality as essential, many continue to act predominantly as uncritical translators or “cheerleaders” of science (Blum, 2021; Nguyen & Tran, 2019). This suggests fundamental differences in how science and non-science journalists relate to the powerful institutions they cover and, more broadly, conceptualize and perform their roles.

Yet, because the watchdog role of science journalists has been largely overlooked in the literature, the reasons behind these divergences and how they manifest in journalistic practice remain unclear. What motivates journalists to act as watchdogs of science? How do they understand this role and to what extent do they see it as one of their core duties? How do they perform their investigations and frame their stories? What factors support or hinder this crucial work? And how do audiences respond? The nine contributions in this thematic issue start to address these questions, providing rich empirical and conceptual insights into a journalistic role that is expanding and evolving alongside changes in the journalistic and scholarly ecosystems. They provide nuance to its various meanings to different stakeholders and highlight its context-specific nature in diverse geographic, institutional, and societal settings. Together, they underscore the ambivalent position of watchdog science journalism (WSJ) in our hybrid media landscape, revealing a set of journalistic practices, functions, actors, and outputs that are both increasingly diverse and vibrant, but also increasingly vulnerable due to formidable challenges.

2. The Watchdog Concept in Context

The lack of scholarly attention to the watchdog role of science journalists raises questions about how often journalists perform this crucial work. This thematic issue clearly shows that WSJ is, indeed, taking place all around us: across diverse countries and regions, via diverse platforms and formats, and by an increasingly diverse cast of individuals and institutions. Its importance is widely recognized by the public (Schug, 2026), the scholarly community (Fahy, 2026), and, most crucially, by journalists themselves (Catanzaro & Peres-Neto, 2026; Ometa, 2026; Peters et al., 2026).

Yet, what counts as WSJ and who is responsible for performing this role is not as straightforward as it might sound. While our original call for papers adopted a broad definition of WSJ (see above), the nine contributed articles display distinct conceptualizations of this role. In her study of mental health and safety challenges, for instance, Ometa (2026) describes how investigative journalists—rather than science reporters—drive WSJ in Romania, one of many countries where specialized science journalism is scarce. The journalists she interviewed are thus watchdogs at heart, with science as just one of many powerful institutions they hold accountable. In contrast, Catanzaro and Peres-Neto (2026) explain that science journalism has deep historical roots in Ibero-America, whereas investigative journalism has been constrained by ongoing challenges. The majority of their participants thus specialize in science or health, with only a few identifying as investigative journalists. Here, the watchdog role may be just one of several roles journalists perform. This raises questions about how a journalist's professional identity—as an investigative journalist, science journalist, or something in between—might shape their conceptualization of the WSJ role, as well as their practices, motivations, and challenges. It also begs the question of whether definitions of WSJ developed in one geographic context can be uncritically applied to other media systems that are shaped by distinct histories, cultures, traditions, or infrastructures.

The public, too, might have different understandings of WSJ than journalists and scholars. Through interviews and focus groups with German citizens on their expectations of science journalists who cover controversial fields, Schug (2026) reveals how nuanced and situation-specific these public expectations are. On the one hand, audiences emphasize the value of independent, critical WSJ that challenges the scientific consensus, ensures “bad” science does not inform policy or decision making, and provides a more accurate picture of how science really works (and why it sometimes doesn't). On the other hand, participants emphasized that not every situation calls for WSJ and that amplifying “good” science can be equally or more important for guiding society through science-related crises, such as pandemics or climate change. Moreover, audiences urge science journalists to carefully weigh the benefits of WSJ against the potential negative consequences (e.g., ruining academics' careers, contributing to distrust in science or journalism). This context-aware evaluation suggests more reflection and nuance may be needed when critiquing science “cheerleading” or calling for more critical, investigative science journalism.

3. Vibrancy: A Diverse and Expanding Ecosystem

The boundaries and scope of the watchdog role are further complicated by ongoing changes in both science and journalism that are reshaping who has the capacity and responsibility to hold science accountable. Key here is the hybrid nature of the digital media environment, with an expanding number of platforms and interfaces that enable scientists, journalists, politicians, citizens, AI agents, and others to interact, contribute, and respond to WSJ in real time (Mede et al., 2025). In this expanding ecosystem,

science journalists do not act as watchdogs in isolation. Instead, their work is supported, extended, recontextualized, complemented, amplified, and challenged by an interconnected web of individuals, organizations, platforms, and infrastructures.

This diversifying web is the focus of Schapals et al.'s (2026) contribution. Through an inductive mapping approach, the authors identify a diverse constellation of actors who exist outside the traditional boundaries of both science and journalism but perform essential watchdog work, including fact-checking organizations, advocacy groups, community peer review infrastructures, and science sleuths. They analyze these actors to propose five distinct but interconnected science watchdog functions: primary investigative watchdogs, infrastructural watchdog platforms, translational intermediaries, corrective verification organizations, and attention-based watchdogs.

Joubert et al. (2026) embody this wider, relational perspective in their conceptual study of the changing relationships between science journalists and institutional science communicators. While well-documented tensions between two types of communicators come with clear risks for the sustainability of independent WSJ, the authors argue that more productive relationships are possible. To protect science journalism's critical autonomy amid the growing power of science public relations (Weingart, 2022), they propose a novel constructive framework grounded in principles of normative clarity, structural transparency, reciprocal respect, and ecosystem-level investment in independent journalism.

The hybridity of the WSJ ecosystem is also central to Fahy's (2026) case study of Retraction Watch, which promotes accountability journalism by investigating and raising awareness of retracted research. Particularly noteworthy is the development of the Retraction Watch Database, a publicly accessible resource providing information on retractions. Originally created out of a journalistic need for more transparent information about the reasons behind retractions, the database eventually grew into one of the most comprehensive sources of retraction information available. Retraction Watch thus fulfils at least two of the functions proposed by Schapals et al. (2026), serving as both a primary investigative watchdog that scrutinizes science and an infrastructural watchdog that provides resources that others—including the scholarly community itself—use to keep science accountable. Fahy (2026) describes this dual identity as “a journalistic hybrid institution, combining science journalism with the scientific infrastructure of its database” (p. 13).

Yang et al. (2026) provide yet another perspective on the hybrid and expanding nature of WSJ, showing how journalists in mainland China are leveraging the growing availability of open-source information and digital infrastructure to investigate biomedical research-integrity controversies with high public relevance. These digital innovations create opportunities at every stage of the WSJ pipeline, from initial idea generation through in-depth investigation to eventual impact on scientific accountability. Yet, relying on open-source information also brings risks, requiring difficult tradeoffs between careful verification and timely response. The findings thus underscore the new relations between journalists, platforms, technologies, and publics but also raise questions about the challenges that might arise when actors with divergent norms, verification practices, ethical principles, and values converge to hold science accountable.

4. Vulnerability: Challenges and Barriers

However one defines WSJ, this thematic issue highlights its challenging and increasingly vulnerable nature, with almost every article describing barriers that make it difficult for science journalists to perform this essential work.

These barriers include fundamental epistemic challenges at the nexus of science and journalism, such as the inherent difficulty of verifying scientific findings, which requires expertise and data access many journalists (and even scientists) simply do not have (Catanzaro & Peres-Neto, 2026; Rueda, 2026; Yang et al., 2026). Here, the not-so-easy task of identifying “conflicts of interest” that Peters et al. (2026) dissect warrants attention. For them, this task is crucial for high-quality WSJ, but conflicts of interest disclosure within academic papers is often opaque, incomplete, or missing altogether. Moreover, the boundaries of what counts as a true “conflict” are often fuzzy and context specific, further complicating journalists’ work. This puts journalists in a difficult position: While ignoring conflicts of interest in reporting could risk amplifying deeply flawed science, overemphasizing conflicts that may have little influence on study findings could undermine public trust in unwarranted or disproportionate ways.

Alongside such epistemic tensions are multiple, intersecting practical barriers that further constrain science journalists’ ability to act as watchdogs. In line with recent research (Fleerackers et al., 2026), several articles (Catanzaro & Peres-Neto, 2026; Fahy, 2026; Ometa, 2026; Rueda, 2026) highlight a range of challenges in accessing essential information, navigating hostile institutions and reluctant sources, staving off legal threats and personal attacks, and managing unreasonable workloads within fast-paced work environments. These overlapping pressures are compounded by deep, structural weaknesses plaguing the media sector in many countries, such as financial precarity, resource scarcity, and an overall lack of institutional investment in high-quality, independent, in-depth science journalism (Joubert et al., 2026; Rueda, 2026). Catanzaro and Peres-Neto (2026) also point to threats posed by authoritative and autocratic regimes that surveil communication and restrict independent journalism. Journalists are thus left to perform watchdog work in what Ometa (2026) describes as “a constant state of pressure characterized by anxiety, exhaustion, cognitive overload, and moral stress” (p. 10). Finding ways to persevere despite these overlapping challenges too often falls on the shoulders of individual journalists, rather than institutions, compromising their personal wellbeing and threatening the long-term sustainability of WSJ.

Rueda (2026), drawing on relevant literature, real-world examples, and her 20+ years of experience as a professional science journalist, adds other distinct constraints faced by journalists in Latin America. These include “implicit and explicit links” between science and journalism and the risk that exposing flawed science will fuel conspiratorial or pseudo-scientific thinking. She calls for a broader conceptualization of WSJ that she sees as both more relevant and more feasible for Latin American journalists: monitoring the (mis)use of science in society to ensure policy, healthcare, and public decisions are based on appropriate, trustworthy evidence. Embracing this broader watchdog role, Rueda (2026) argues, would “significantly increase the relevance of science journalists” by shifting them away from being mere translators of scientific studies to “key actors who create conditions for active citizen participation” (p. 3). Her commentary, again, raises important conceptual questions about the scope of the watchdog role in different reporting contexts. In holding science to account, how narrowly or broadly should journalists define “science”—and what does this mean for the relevance, impact, and feasibility of their work?

5. Conclusion

Both science and journalism have been under pressure for decades, compromising the quality and trustworthiness of the research that makes its way into the public sphere. The contributions in this thematic issue make this abundantly clear, revealing the importance of the WSJ role and the expanding possibilities for fulfilling it, but also the growing precarity that threatens to undermine its long-term sustainability. They highlight the need for further research, more recognition, and, most importantly, immediate, structural intervention to ensure journalists have the support they need to keep science in check. Without widespread investment in independent, in-depth, and critical science journalism, the wellbeing of society—and of science itself—is at risk.

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Conflict of Interests

The authors declare no conflict of interests.

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Shining Light on “Dark Science”: Mapping the Field of Science Watchdog Journalism

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Abstract

The journalistic watchdog role has traditionally been theorised as a mechanism for scrutinising political power. Yet comparatively little scholarly attention has been paid to watchdog practices that target science itself, despite growing concerns about research misconduct, misinformation, and the misuse of scientific authority in digital media environments. This study addresses this gap by conceptualising and mapping the emerging ecosystem of science watchdog journalism. Building on literature in journalism studies, science communication, and research integrity, the study defines science watchdog journalism as forms of journalistic and journalism-related scrutiny that monitors the production, communication, and use of scientific knowledge. Empirically, the study adopts an inductive mapping approach to identify actors engaged in science watchdog practices across contemporary platformised media environments. Drawing on case-based analysis, media monitoring, and multi-platform searches, we identified that actors are operating in a diverse science watchdog ecosystem that extends far beyond traditional investigative journalism. Science watchdog functions are increasingly performed by a broad range of actors, including research-integrity specialists, fact-checking organisations, advocacy groups, and highly visible individual commentators. Five primary watchdog functions are identified: primary investigative watchdogs, infrastructural watchdog platforms, translational intermediaries, corrective verification organisations, and attention-based watchdogs. Importantly, the study expands beyond Western media systems, highlighting watchdog initiatives operating across multiple global regions. By conceptualising science watchdog journalism and systematically mapping its actors and functions, the study contributes to journalism theory by proposing a broader understanding of watchdog practices in an era of platformised media and contested scientific authority.

Keywords

investigative journalism; misinformation detection; peripheral actors; research integrity; science communication; scientific misconduct; watchdog journalism

1. Introduction

In 1998, *The Lancet* published a paper led by British physician Andrew Wakefield claiming a link between the measles, mumps, and rubella (MMR) vaccine and autism, triggering widespread public alarm and fuelling vaccine hesitancy (Rodriguez, 2025). Over several years, investigative journalist Brian Deer conducted a meticulous inquiry for the UK's *Sunday Times*, uncovering undisclosed financial conflicts of interest, ethical breaches, and evidence of data misrepresentation. Deer's reporting ultimately contributed to formal investigations by the General Medical Council and the retraction of the article from *The Lancet* in 2010 (Goldenberg, 2021), illustrating how investigative journalism within mainstream media institutions can correct the scientific record and protect public health. Beyond mainstream investigative journalism, science watchdog practices have increasingly emerged through digital platforms and hybrid forms of scrutiny operating outside traditional journalistic institutions. For example, platforms such as PubPeer enable researchers and independent analysts to publicly scrutinise published science. Yet, these peripheral science watchdog practices often lack the institutional protections afforded to journalists. For example, the commenter known as "Clare Francis" (a well-known pseudonym used by anonymous PubPeer commenters) faced a legal effort to compel disclosure of their identity during a defamation dispute, after raising concerns about research published by Wayne State scientist Fazlul Sarkar on PubPeer (Oransky, 2015). While diverse forms of scrutiny in contemporary science "watchdogging" are growing, without the editorial oversight, legal teams, and institutional backing typically available within mainstream media and specialised science publishing organisations, these actors face new challenges.

Building on these examples, this study examines the emerging ecosystem of science watchdog journalism—made up of actors dedicated to exposing scientific misinformation, misconduct, and malpractice, especially where these actors speak back to problematic aspects of institutionalised science and abuses of scientific power. This ecosystem spans both institutionalised and peripheral forms of watchdog practice. Leading scientific publications, such as *Nature* and *Science*, have expanded their journalistic functions to include sustained investigative reporting on research integrity, including paper mills, image manipulation, large-scale retractions, and failures of peer review. For example, *Nature* has published a series of news features on fraudulent publication infrastructures (e.g., Porter & McIntosh, 2024) and the work of "science sleuths" (e.g., Kwon, 2025), as well as analyses of systemic misconduct trends (Kozlov, 2026). *Science* has reported on high-profile retractions and contested findings (e.g., Brainard, 2024; Normile, 2024; Thorp, 2022), reflecting a broader shift toward scrutinising the reliability and governance of scientific knowledge production. While the journalistic watchdog role has traditionally been theorised in relation to *political* power (Mellado, 2014), much less attention has been paid to watchdog practices that *target science itself*—and this is despite pressures on research integrity, the amplification of pseudo-scientific claims, or even problematic scientific outputs and evidence circulating on digital platforms.

Science watchdog journalism operating at the intersection of journalism and advocacy remains a severely understudied subset of science communication. This current lack of scholarly attention may be due to the

fact that science watchdog journalism practices are more visibly anchored at the periphery of journalism, where they have emerged in response to gaps left by traditional, mainstream forms of science journalism, particularly in contexts where newsroom resources are limited (Franks et al., 2023) or where institutional pressures constrain critical reporting or simply because journalists are not equipped to understand the processes involved in the production and distribution of scientific knowledge. As such, rather than focusing on legacy media, our study explicitly investigates peripheral actors such as non-profit investigative outlets, digital journalism start-ups, science collectives, and individual researchers and activists who operate at the margins of journalism and science but play central roles in exposing the “dark sides” of science.

We investigate who these actors performing science watchdog journalism roles are, what watchdog functions they fulfil, and what conditions they operate under. We use the term “actor” herein to refer collectively to individuals, news outlets, organisations, and initiatives. Following a review of relevant literature bringing together work on watchdog journalism and science communication, we describe our mapping approach which systematically maps and categorises a diverse range of actors engaged in science watchdog activities across different geographic locations. We show how science watchdog practices emerge from media industry and institutionalised science contexts to meet the needs of specific regional and cultural contexts. Finally, we advance an agenda for decentring Western and mainstream media-centric assumptions about science watchdog journalism and expanding the field’s analytical horizons.

2. Literature Review

In this section, we first trace the concept of being a “watchdog” back to its origins and find that the role is commonly associated with being a watchdog over those in *political* power. Next, we highlight that the field of watchdogs over science, in particular, has greatly expanded over the past few years. This finding merits a standalone conceptualisation of science watchdog journalism as we understand it herein, offered at the end of this section.

2.1. Watchdogs in (Science) Journalism

The watchdog role is well established in journalism, first theorised in the early 20th century by American journalist Walter Lippmann in his seminal works, *Liberty and the News* (1920) and *Public Opinion* (1922). At the core of this role conception lies the understanding of journalism as a monitoring institution, acting as checks and balances on political power and providing the public with essential information for democratic decision-making. In terms of the role’s enactment in practice, it is still most frequently tied to the Watergate scandal of the 1970s, when two *Washington Post* journalists uncovered abuses of power by US President Richard Nixon which, ever since, has become a textbook example in journalism education and its linkages to democratic theory. Later, in her seminal work on journalistic role performance, Chilean scholar Claudia Mellado stratified the most observed journalistic roles in a global context across six dimensions: interventionists, watchdogs, supporters, service providers, infotainment, and civic roles (Mellado, 2014). Importantly, in the literature, the watchdog role is most frequently tied to cases of *political* wrongdoing: For example, Standaert et al. (2021) offer an elaborate framework of journalistic roles in political life, in which they highlight, among others, journalists’ critical/monitorial role as a fourth estate over those in political power, a role most pronounced in Western contexts.

Scholars Declan Fahy and Matthew Nisbet have conceptualised the roles of science journalists as curators, conveners, public intellectuals, and civic educators, and have also found that science journalists occupy traditional journalistic roles including reporters, conduits, agenda setters, and, most importantly, watchdogs—a role which specifically “holds scientists, scientific institutions, industry, and policy-orientated organisations to scrutiny” (Fahy & Nisbet, 2011, p. 780). In their study of US and UK science journalists, they find that “journalists...strongly identified with the watchdog role, stressing that this meant they covered critically the scientific community itself, new scientific findings, challenges to scientific knowledge, science policy claims, and, indeed, science journalism itself” (p. 790). Similarly, in their study on journalists as brokers of scientific knowledge, Gesualdo et al. (2020) identified awareness, accessibility, engagement, linkage, and mobilisation as central roles, with the latter being a call to the public to act based on scientific knowledge, which, of course, harks back to the public service function of journalism (Deuze, 2005). These findings also somewhat align with both Hanitzsch’s (2007) and Mellado’s (2014) conception of journalists as interventionists and as assertive and motivated actors in the public sphere, which stands in contrast to the detached, objective, and neutral conception of traditional journalists (Deuze, 2005).

That said, the watchdog ideal is occasionally contested within science journalism itself, and some science journalists neither identify with, nor aspire to, a watchdog role. As noted, the watchdog role is one of many, and the explainer and educator role is frequently favoured over its adversarial counterpart (Fahy & Nisbet, 2011). This shows that, in practice, the actualisation and enactment of the journalistic watchdog role is not quite as straightforward, particularly during times of heightened political uncertainty or during significant public health or environmental crises. The reasons for this are primarily systemic: For example, in heavily under-resourced newsrooms, science journalists were found to practice “copy-and-paste journalism,” including from press releases from big pharma companies, thereby acting as cheerleaders for for-profit conglomerates (Franks et al., 2023). Other such systemic issues became particularly evident during the global Covid-19 pandemic, where many journalists in general, and science journalists in particular, demonstrated a lack of familiarity with the scholarly peer-review process and were shown to unskeptically report preprints, i.e., published scholarly work which had not (yet) undergone peer-review (Fleerackers et al., 2022). This is problematic insofar as the “uncritical reliance on scientific experts risks compromising their [journalists’] ability to serve the public interest and retain independence and autonomy from their sources” (Fleerackers, Moorhead, et al., 2025). Other research has gone as far as to describe US journalists during the pandemic as “glorified minute takers” (Mesmer et al., 2024), citing as reasons a lack of training in specialised science beats, a need to publish quickly, and an overt reliance on official sources (see also Klemm et al., 2019), as well as a feeling of being overwhelmed at the onset of the crisis, leading to uncritical reporting of science news about Covid-19. Like investigative journalism in general, science watchdog journalism can be labour and time-intensive: Relevant sources and evidence can be challenging to acquire, and media outlets may not recognise the value of the story or risk libel suits (Fleerackers, Moorhead, et al., 2025).

Such systemic issues highlight the shortcomings that can arise when legacy media no longer operate specialised health or science beats and are structurally under-resourced. Simultaneously, this development opens the door for non-legacy watchdog actors to fill this scrutiny void, particularly during significant public health crises. Indeed, the terrain of peripheral (i.e., non-legacy) science journalism has increased over the years, comprising a multitude of actors who are holding science up to scrutiny and are acting as watchdogs.

2.2. Expanding the Field of Watchdog Actors

Public access to digital networks and communication infrastructures has meant that a range of new actors now complement the legacy, institutionalised fields of science and media. This new range of actors can actively participate in public debates around science. Indeed, “it has become an *inevitable condition* of digital public spheres: new actors have emerged as visible voices in science communication, regardless of whether or not they were invited to participate” (Brüggemann et al., 2020, p. 12, emphasis in original).

Drawing on the concept of boundary work as articulated by Thomas Gieryn in his influential 1983 article on the demarcation of science from non-science (Gieryn, 1983), and further incorporating the flourishing field of peripheral actors (Holton & Belair-Gagnon, 2018) working on the margins of journalism, the distinct term “peripheral science journalism” connotes “online channels dedicated to producing and disseminating online content” and “individuals...whose primary motivation is a social one: to share science news with the general public and enhance public engagement with science” (Ginosar et al., 2024, p. 933). This may include science news websites which share features with journalistic institutions but also include research amplifier platforms including *The Conversation* as a boundary-spanning organisation (Ginosar et al., 2024).

Indeed, the research amplifier platform *The Conversation* is a prime example of a peripheral science journalism actor having gained traction during significant public health emergencies, including the global Covid-19 pandemic (Schiffrin, 2020). By enabling academics to present their research findings to the general public in an accessible, journalistic style, the platform not only acts as a critical science communication intermediary but also as a response to the dissolution of many specialised health and science beats across increasingly financially strained legacy news organisations. Notably, and beyond providing expert advice and commentary on (predominantly) scientific matters, however, *The Conversation* also plays an active role in research integrity activism, including discussions surrounding scientific fraud and misconduct, paper mills, issues to do with peer review, scientific corrections, as well as wholesale retractions. As such, *The Conversation* transcends its core function in acting as a bridge between academia, journalism, and the public, but is also active in public accountability and advocacy; thus, we ascribe certain watchdog functions to research amplifier platforms, too.

The Conversation is one of several actors active in the emerging field of science watchdog journalism. As challenges surrounding research integrity activism become more frequent, including recent challenges to scholarly publishing practices due to the rise of GenAI technologies and tools, citation manipulation, predatory journals, paper mills, and science-for-profit tactics (Fleerackers, Nguyen, et al., 2025), so too do the number and diversity of actors operating as watchdogs over scientific malpractice increase. Research on these actors mostly centres on single case studies of more established actors recognised as occupying central roles in science watch journalism, such as *Retraction Watch* (see, e.g., Mede et al., 2025).

Founded in 2010, *Retraction Watch* has become a central institution in contemporary science watchdog journalism, conducting sustained investigative reporting on scientific retractions, paper mills, instances of image manipulation, and research misconduct. The watchdog outlet has built an influential archive of cases and a widely used retraction database, now referenced by journalists, publishers, and research integrity investigators. Rather than operating at the margins of the media ecosystem, *Retraction Watch* connects investigative reporting, post-publication peer review communities, and institutional accountability processes

(Kar, 2024; Xu et al., 2023). This central position of *Retraction Watch* complicates assumptions that science “watchdogging” practices outside of mainstream newsrooms or specialist science media occur primarily through peripheral actors or informal online networks. For researchers studying peripheral watchdog actors, including anonymous PubPeer commenters, independent analysts, or meta-research bloggers, the prominence of *Retraction Watch* emphasises how influence often depends on hybrid positioning: Actors may appear peripheral to mainstream media yet significantly shape agendas, circulate evidence, and translate technical scrutiny into widely recognised cases of scientific accountability. A diverse range of actors, peripheral to mainstream media, is expanding the field of science watchdog journalism, including those with particular corrective, verification functions, such as fact-checking organisations; those with public signalling or agenda-setting functions; and so-called “scienfluencers” (or science influencers) who rely on high levels of public visibility on their respective social media profiles. Cases such as these exemplify that watchdog roles can no longer exclusively be conceptualised in terms of actors being watchdogs over those in political power or actors operating in legacy settings.

Despite the increasing, but slow recognition of these science watchdog actors in public debates, to this date, no study has attempted to systematically classify *who* performs science watchdog journalism globally, and *what* respective functions these actors perform in these spaces. What’s more, no study thus far has conceptualised science watchdog journalism as it pertains to *peripheral actors*. This study is the very first to do so, and as such offers a conceptual contribution beyond the mapping approach we present herein.

2.3. Conceptualising Science Watchdog Journalism

In this study, we conceptualise *science watchdog journalism* as forms of journalistic and journalism-related scrutiny that monitor the production, communication, and use of scientific knowledge. It focuses on exposing scientific misconduct, research malpractice, misinformation, and the misuse or misrepresentation of scientific authority.

Unlike traditional watchdog journalism, which scrutinises *political* power, science watchdog journalism directs accountability towards science itself. It operates within a distinct ecosystem that includes investigative journalists, research-integrity specialists, fact-checking organisations, digital platforms, advocacy groups, and influential science communicators. Importantly, this conceptualisation recognises that science watchdog functions are increasingly performed not only by institutional journalists, but also by peripheral and hybrid actors operating at the intersection of journalism, science, and advocacy.

In contemporary digital media environments, science watchdog journalism encompasses a range of practices, including investigative reporting on research misconduct, verification and debunking of scientific misinformation, infrastructural tools enabling post-publication scrutiny, translation of integrity investigations to broader publics, and public signalling that generates reputational accountability within scientific communities.

Taking this novel conceptualisation as a starting point, we chose a mapping approach to classify these actors by the type of watchdog role that best describes them and their primary watchdog *function*. While we do not claim completeness for this classification model, our study is the first of its kind to develop an exploratory typology that systematically categorises a diverse range of actors operating within the growing science watchdog journalism ecosystem.

3. Method

This study maps actors associated with science watchdog journalism operating within contemporary platformised and democratised media environments. We acknowledge that mapping activities impose order on complex phenomena rather than discovering pre-existing natural categories. In this study, we present one empirically grounded way of organising the landscape of science watchdog journalism actors. As such, it remains a provisional categorisation that invites further investigation as new actors emerge in response to changes in the science and media ecosystems. The aim of this mapping was not to produce an exhaustive list of all science watchdog actors globally, but rather to develop a functional classification framework capable of capturing key forms of watchdog practice across institutional, hybrid, and peripheral contexts. As such, the primary value of this mapping lies in its capacity to reveal patterns of variation in science watchdog function and alignment with professional norms, thereby identifying emerging science watchdog practices.

Rather than beginning with predetermined theoretical categories, this study adopted an inductive, ground-up approach where the classification dimensions emerged iteratively from the authors' discussion of the actors associated with the identified watchdog activity. Science and journalism fields are constantly being maintained as legitimate and delimited spaces of knowledge by insiders who adhere to normative values and ideals specific to the fields of scientific and journalistic production. Regarding debates over the delimitation of scientific and journalistic fields, Bourdieu's sociology is useful for identifying the practices that enable the delimitation and understanding of both scientific and journalistic authority. Aligning with Gieryn (1983) who finds it useful to consider *contrasting cases* of communities (e.g., religious, political, practical, or pseudoscientific), we consider that investigations of contrast may reveal important areas of demarcation in science watchdog journalism. While Gieryn's reflections speak of a moment in the history of science and its demarcation from non-science, we also observe how science watchdog journalism actors are considered central or peripheral to the norms and practices of institutionalised science and mainstream journalism. That said, both theoretical concepts were herein invoked for their general delimitation of scientific and journalistic fields, rather than practically operationalised in the study's methodological approach.

3.1. Data Collection

We began by identifying and collecting case studies of science watchdog activity and reporting drawn from the existing, but still extremely limited, academic literature focused on the reporting of scientific misconduct and research integrity breaches. We supplemented this list of cases with results from targeted web and platform searches that captured existing organisations, initiatives, and individuals engaged in science watchdog-related activities. Our searches were conducted between August 2025 and January 2026, using multiple keyword combinations designed to capture the breadth of activity in the area: scientific or research misconduct, scientific or research fraud, scientific or research integrity, scientific or research fabrication, retraction, predatory journals, post-publication peer review, scientific image manipulation, PubPeer, *Retraction Watch*, and science fact-checking. The searches were conducted on Google, Google News, Substack, Medium, X, Bluesky, Mastodon, and LinkedIn. Given the documented migration of science communities away from Twitter/X following platform changes in 2022–2023 (Valero, 2023), this multi-platform approach to data collection was essential.

We then used snowball sampling to expand the dataset with additional organisations, initiatives, and individuals. We first reviewed the identified actors' websites and platformised media presences to identify allied initiatives, and taking a metajournalistic discursive approach (Carlson, 2016), we considered these actors' (self-)presentation on their own platforms and media coverage about them (as science actors, journalism/media actors, or hybrid identifications). Secondly, we employed case-based tracking and examined media coverage of high-profile misconduct cases to identify actors who repeatedly appeared or engaged in investigative reporting. Finally, we employed citation tracking within relevant investigative reports and content identified from social media, newsletter-based, and social/blogging platforms to identify additional watchdog actors. We continued snowball sampling until no new novel actor types emerged. Our data collection approach was deliberately broad, adopting an expansive definition of science watchdog activity that includes all actors who appear to "speak back to science" in the public interest. While the study primarily foregrounds peripheral and hybrid watchdog actors, selected institutional and legacy media organisations were also included where they performed particularly visible or influential science watchdog functions within the broader ecosystem. After five passes through the emerging list, supplementary searches, and discussions about these and other cases, we identified a final sample of 60 distinct watchdog actors active up until the cut-off date in January 2026 for typological analysis.

3.2. Mapping Approach

Following Gieryn's (1983) pragmatic study of science and non-science boundary work and considering the primary function of these actors in relation to science watchdog journalism, we iteratively examined the identified actors to discern patterns of variation that might contribute to a better understanding of science watchdog activity within platformised media ecosystems. For each identified actor, we compiled detailed profiles documenting the organisational structure and legal status, the funding and sustainability models, the primary activities and intervention modes, the focus and scope of scrutiny, the platform deployment strategy, the positioning of actors to institutionalised authority (science, media, or hybrid), the stated or implied target audience/s, and the actors' pathway to impact.

Through iterative comparative analyses of these profiles, two researchers in the coding team identified the main institutional/field alignments and the functions of science watchdog activities. They then iteratively refined the dimensions as new cases were incorporated to ensure that we captured empirical variation. They collapsed categories where we identified that actors shared substantial but not complete similarity. For example, individual researcher actors classified as "platform-based science sleuths" formed a collapsed category of primary investigative functions with mainstream media and specialist science magazines, where actors initiate scrutiny, uncover misconduct, and generate original claims.

The two coders identified the key functions of science watchdog journalism, capturing empirically meaningful variation that overlapped with institutional alignments (science, media, and hybrid alignments). Each identified science watchdog actor was systematically coded for their function and provisionally assigned to categories through author consensus. However, individual actors varied in their platformised activities and the degree to which their activities received institutional recognition. Cofie et al. (2022) explicitly argue that a qualitative, descriptive characterisation of agreement through consensus coding of the kind employed in this project, emphasising coder dialogue, reflexivity, and consensus, can be more compatible with interpretivist qualitative paradigms than quantitative intercoder reliability. Researchers also argue that this consensus coding process

offers the same assurance of trustworthiness and consistency that intercoder reliability assessment is meant to signal, while better honouring the contextual, interpretive nature of qualitative data (Clarke et al., 2023; Hemmler et al., 2020).

The resulting mapping organises science watchdog actors according to science watchdog function, with secondary differentiation by proximity to science (scientific institutions) or the journalism field (media institutions).

4. Findings

Table 1 presents an exploratory mapping of science watchdog types and functions identified in this study. The findings show that accountability around scientific integrity is produced through several distinct but overlapping categories of actors. In several cases, allocating an actor to one category proved challenging because these actors performed multiple—as opposed to singular—functions. However, we were able to identify a *primary* function for all actors; these were allocated to the primary functions through author consensus (see Supplementary File for the allocation of actors).

In total, we identified five watchdog types: primary investigative watchdogs, infrastructural watchdog platforms, translational intermediaries, corrective verification organisations, and attention-based watchdogs. Each of their watchdog functions is discussed below, along with their self-perceptions of institutional alignment with either scientific institutions, media institutions, or a combination of these (i.e., hybrid).

Table 1. Classification of science watchdog journalism types and functions, including examples.

Group	Watchdog Type	Watchdog Function
1	Primary investigative watchdogs	Initiating scrutiny, uncovering misconduct, and generating original claims
2	Infrastructural watchdog platforms	Enabling, archiving, and legitimising scrutiny
3	Translational intermediaries	Translating watchdog findings into authoritative mainstream discourse
4	Corrective verification organisations	Rapid verification, debunking, and fact-checking
5	Attention-based watchdogs	Public signalling, agenda-setting, and reputational pressure

Primary investigative watchdogs play a foundational role in science watchdog journalism by initiating scrutiny, uncovering misconduct, and generating original claims about failures within the scientific research and scholarly communication system. Traditionally, these functions have been performed by investigative journalists working in mainstream media institutions and specialised science outlets. Major newspapers and investigative newsrooms such as *The New York Times*, *The Guardian*, and *ProPublica* have produced landmark investigations into biomedical fraud, toxic exposure, and regulatory failures, often setting the agenda for broader public and policy debates about scientific credibility. Specialist science journalism platforms extend this work within the research ecosystem itself, routinely exposing issues such as paper mills, clinical-trial irregularities, and image manipulation.

For example, *The Guardian* and its science reporters have continued journalistic investigations into paper mills and data transparency for scientific reproducibility, often building on cases initially revealed by other

organisations such as *Retraction Watch* or *Nature* (McKie, 2024). Alongside these institutional actors, specialised watchdog outlets and hybrid journalism-science initiatives have emerged, most prominently *Retraction Watch*, which functions as a dedicated accountability hub tracking retractions and misconduct across global scholarly publishing. Similar initiatives have developed beyond Western research centres, including *Plagio SOS* in Latin America and *India Research Watch*, which rely on insider reports, collaborative investigation, and partnerships with mainstream media to expose malpractice. Finally, the field increasingly includes individual research-integrity sleuths working from within science itself, whose technical expertise enables them to identify issues such as image manipulation, paper-mill activity, and machine-generated text, demonstrating how investigative watchdog functions can also emerge from within scientific practice.

Infrastructural watchdog platforms enable accountability in science by building systems that make scrutiny visible and durable. Unlike investigative journalists or individual science sleuths, these platforms do not themselves interpret or publicise specific cases. Instead, they support scrutiny by providing robust infrastructures that enable distributed oversight, allowing researchers, editors, and integrity investigators to detect patterns of misconduct and maintain public records of concerns. These tools archive evidence, automate the detection of irregularities, and create shared spaces where researchers can evaluate problematic publications before or after formal peer review has ended.

Platforms such as PubPeer, Statcheck, and ImageTwin illustrate this infrastructural form of watchdogging. PubPeer operates as a global post-publication peer-review forum where scientists publicly comment on published papers, often identifying image manipulation, statistical anomalies, or methodological concerns that escaped traditional editorial review. Statcheck automates the verification of reported statistical tests by recomputing *p*-values from published statistics, revealing widespread inconsistencies across the literature. Finally, ImageTwin enables large-scale automated image comparison across scientific publications, helping journals and institutions detect duplicated or manipulated figures.

Translational intermediaries play a key role in science watchdog journalism by converting specialised watchdog findings into accessible and authoritative public discourse. While they do not typically initiate scrutiny or conduct original investigations, they act as crucial bridges between primary investigative watchdogs and broader audiences. By translating complex research-integrity issues into journalistic formats, these actors enable wider visibility, interpretation, and uptake of watchdog findings across media and public spheres.

Actors such as *The Conversation*, *Scientific American*, *Times Higher Education*, and *360Info* illustrate this translational function. These platforms provide spaces where metascience researchers, science sleuths, and investigative journalists can communicate their findings to wider audiences, often contextualising cases of misconduct or questionable research practices within broader scientific and societal debates. While many of these intermediaries are primarily known for amplifying academic knowledge and research, they also contribute to science watchdog journalism by extending the reach and public impact of integrity-related investigations. Their established audiences, often global and highly engaged, position them as key actors in raising awareness of scientific malpractice and embedding watchdog findings within mainstream discourse.

Corrective verification actors operate as a specialised subset of fact-checking and verification organisations by scrutinising misleading or contested scientific claims circulating in public and media domains. Their

primary function lies in the rapid verification, contextualisation, and correction of science-related misinformation, often by comparing claims against established scientific evidence and expert consensus. These actors became particularly visible during major misinformation events, such as the Covid-19 pandemic, where they addressed the decontextualisation and politicisation of scientific knowledge. While their practices align with journalistic verification norms, their work is typically highly specialised and focused on complex scientific issues.

Actors such as *SciCheck*, *Climate Fact Checks*, and *Science Feedback* illustrate this corrective verification function by systematically evaluating claims about vaccines, climate change, and other contested scientific topics. Their work typically involves consulting expert sources, analysing scientific literature, and assessing the accuracy of public statements made by politicians, media figures, or social media users. Beyond these hybrid verification initiatives, organisations embedded within scientific advocacy and policy infrastructures also perform corrective watchdog roles. For example, the Center for Science in the Public Interest scrutinises scientific claims in public health and food marketing, while the Union of Concerned Scientists monitors political and corporate interference in scientific processes. These actors demonstrate how corrective verification extends beyond traditional fact-checking into broader science governance contexts, relying on expert networks, policy engagement, and evidence-based analysis to challenge misinformation.

Attention-based watchdogs operate through public signalling and agenda-setting rather than formal investigation. High-visibility scientists and commentators use blogs, social media, public talks, and online essays to draw attention to misleading claims, questionable methods, and exaggerated research findings. By highlighting such issues, they generate reputational pressure on researchers, journals, and institutions, encouraging accountability through visibility rather than through formal journalistic intervention. Their work is typically independent of media institutions or formal verification organisations and relies on reach, credibility, and audience engagement.

Figures such as Katie Mack, Andrew Gelman, and Carl Bergstrom illustrate this form of watchdog activity. Katie Mack uses writing, public talks, and social media to challenge scientific hype and clarify misconceptions, particularly in areas such as cosmology and climate change. Andrew Gelman performs a similar function in the methodological sphere, using his widely read blog to critique flawed statistical models, *p*-hacking, and overinterpreted findings. Carl Bergstrom combines research expertise with public communication, notably through his work *Calling Bullshit*, which helps audiences identify misleading statistics and data-driven misinformation. Collectively, these actors function as distributed “scienfluencer” watchdogs who enforce norms of scientific credibility by directing public attention to problematic claims and practices.

5. Discussion

In this study, we identified the core functions of a broad and diverse set of actors in the science watchdog journalism landscape, capturing empirically meaningful variation that overlaps with two main institutional alignments, media and science. We also captured organisations and actors identifying with hybrid alignments, i.e., those aligning themselves with both institutions.

Our findings demonstrate that science watchdog journalism, as a specific subset of science communication devoted to investigations of “dark science,” has now well and truly expanded beyond traditional,

investigative journalism. Indeed, the field now encompasses a broad ecosystem of actors operating across journalism, science, and hybrid spaces. This study is the first attempt to bring some order to what has become an increasingly messy, definitional space. Our mapping approach reveals five distinct categories of actors operating in the science watchdog journalism space: primary investigative watchdogs, infrastructural watchdog platforms, translational intermediaries, corrective verification organisations, and attention-based watchdogs. Upon closer inspection of each actor, we found that critical watchdog functions are increasingly being performed by those known in the literature as “peripheral actors” (Holton & Belair-Gagnon, 2018). Unlike legacy news organisations and their well-known work of uncovering malpractice in science, our contribution lies in highlighting marginal, para-journalistic actors, including research-integrity sleuths, fact-checking organisations, digital journalism start-ups, and advocacy groups. What’s more, these actors do not necessarily exist in isolation but, in fact, form part of a growing ecosystem in which journalists, scientists, platforms, and advocacy actors collectively expose misconduct, misinformation, and research integrity issues, thereby highlighting the value of collaboration (Walters, 2024).

The implicit linkages we draw between journalism and (Western) ideals of democracy, whereby an enlightened citizenry can intelligently participate in decision-making, and journalists act as watchdogs and a Fourth Estate over those in *political* power, are well established in scholarly literature (Mellado, 2014). However, we argue that the current, platformised media environment we find ourselves in has enabled entirely new forms of watchdog activity over the *scientific* community, too, with examples ranging from post-publication peer review to automated plagiarism detection tools and social media-driven scrutiny of scientific claims. Above all—and most crucially—our findings prompt a wholesale rethinking of traditional journalism theory: Watchdog journalism, we argue, must be conceptualised much more broadly to include actors operating at the margins of *both* journalism and science. The sheer number of actors we have found operating in this space is testament to this—and our list is not exhaustive.

Collectively, these actors contribute to greater scrutiny of science, faster exposure of misconduct, and increased amplification of perhaps otherwise ignored issues. While such an emerging science watchdog journalism ecosystem undoubtedly has its benefits, it also has obvious downsides: given their limited resources, and their dependence on often precarious labour, their long-term survival is anything but guaranteed. It is also worth noting that the lack of formalised accountability procedures, such as highly visible corrections in case suspected misconduct turns out to be false, means that these actors are at heightened risk of defamation, and without strong institutional or union-backed support networks as they are commonplace in legacy media organisations, the ecosystem is particularly susceptible to legal challenges. To mitigate that risk, it is therefore recommended that peripheral science watchdog journalists more explicitly highlight their evidence-based approach and methodological robustness, as well as possible funding sources or other affiliations to increase transparency and, conversely, trust in the system.

On a more conceptual level, the significant journalistic capital (Örnebring et al., 2018) that peripheral actors have attained over the years, as well as the fact that these actors’ motivations and practice often overlap with those of their legacy counterparts, makes it increasingly difficult to continue to place these actors on the discursive periphery of journalism (Schapals, 2025). Naturally, too, discussions on the periphery depend on where the core of journalism is located: perhaps the actors we categorised as inhabiting a hybrid institutional alignment—that is, those who align themselves both with the values of legacy media institutions as well as institutionalised science—are the new centre? As such, calls for a more careful reconsideration of

who and what ought to be classified as “peripheral” persist, also in the science watchdog journalism space. Relatedly, one may even go as far as to question whether journalism as a lens through which we have observed these actors is perhaps too narrow, given these actors’ inherent hybridity. This is where their functions—used as an analytical dimension to classify them—come in again: many of these mapped actors perform core journalistic functions, including investigation and verification, regardless of institutional origin. Analogous to our classification—where we have clustered these actors based on *what they do* (their primary functions) rather than *who they are* (their professional identity)—we argue that their orientation towards public accountability and visibility justifies looking at them through a journalism lens.

Notwithstanding this argument, we recognise that some of the actors we identified are far removed from conventional journalistic practice—and yet are still performing traditional journalistic watchdog roles. In fact, we know that there is an ecosystem of non-governmental and advocacy organisations that now perform political watchdog functions traditionally associated with investigative journalism. These groups are often described as civil society watchdogs and accountability NGOs that monitor government behaviour, corporate power abuses, and institutional misconduct; this includes the Sunlight Foundation, Human Rights Watch, the Project on Government Oversight, and Citizens for Responsibility and Ethics in Washington, among others. Indeed, research suggests a hybridisation of watchdog functions where investigative reporting, data work, legal advocacy, and civil-society campaigning are increasingly entangled, with journalistic outlets collaborating with non-journalistic outlets, particularly where data journalism skills are needed and especially as newsrooms’ investigative capacity declines (see, e.g., Carson, 2021; Walters, 2024).

Such practices, however, are not only evident across major organisations. For example, our study has found several instances of so-called “science sleuths” operating in a single capacity on highly visible accounts on various social media platforms. They, too, fulfil a watchdog function beyond traditional forms of journalism. Rather than investigative reporters, scrutiny often comes from research integrity specialists, meta-science researchers, independent analysts on post-publication platforms, or researchers using computational fraud detection tools. Their work often appears on PubPeer, or feeds into outlets like *Retraction Watch* or journals’ respective editorial investigations. Conversely, however, there are actors who *claim* to expose bias, ideology, corruption, or other hidden interests, but do so from a populist, conspiratorial, anti-institutional, or anti-science position. This goes to show that “watchdogging” science is not normatively homogenous but can itself challenge or even reject scientific authority in problematic—and arguably “dark”—ways.

Beyond the study’s contribution in highlighting who is active in the science watchdog journalism space, and what functions these actors inhabit, crucially, this study also moves beyond the known, and overly dominant, Western-centric analyses of journalism by deliberately mapping watchdog actors operating across multiple global regions. In doing so, we demonstrate that science watchdog journalism is a global phenomenon, not confined to Western legacy media systems. Importantly, this broader geography is not only visible at the level of abstract regional spread, but also in the presence of concrete initiatives outside of dominant Anglo-American journalistic and scientific centres. For instance, we identify important investigative watchdog initiatives in the Global South, including actors monitoring research integrity in Latin America and South Asia. In Latin America, initiatives such as *Plagio SOS* point to locally grounded forms of scrutiny around plagiarism, authorship, and research misconduct; in South Asia, *India Research Watch* has emerged as a notable actor drawing attention to retractions, plagiarism, and systemic weaknesses in research governance. *India Research Watch* in particular positions itself as a non-profit, watchdog-style initiative focused on

exposing malpractice and improving research quality, illustrating how science accountability work can be undertaken outside traditional journalistic institutions. Such initiatives have profound implications on local scientific communities, as exemplified by the Romanian *Pandora Project*. Despite being located in Europe, it has largely flown under the radar in mainstream discussions of science watchdog journalism, notwithstanding its role in exposing suspected plagiarism and contributing to retractions in Romanian biomedical publishing. These examples point to a critical finding: Our study shows that institutional contexts with weaker formal research integrity infrastructures can *still* stimulate grassroots or civil society watchdog initiatives. As such, this study openly challenges assumptions that investigative scrutiny of science is exclusively driven by Western legacy media—instead revealing a much broader geographical ecosystem of watchdog actors. Beyond the subject matter itself, our study contributes to an increasing number of efforts to de-westernise journalism studies by acknowledging the diverse institutional arrangements through which watchdog functions are contemporarily performed.

6. Conclusion

In this study, our starting point was to fill both a theoretical and empirical gap left in previous scholarly work on science journalism: first, to offer a new conceptualisation and definition of science watchdog journalism; and second, to map the emerging ecosystem of science watchdog journalism, particularly as it unfolds on the periphery of journalism. Doing so has allowed us, for the first time, to identify a total of five primary watchdog types and functions within the science watchdog journalism ecosystem: primary investigative watchdogs, infrastructural watchdog platforms, translational intermediaries, corrective verification organisations, and attention-based watchdogs.

The study makes a core conceptual contribution to research investigations of the journalistic watchdog role, which in the literature is tied to instances of “watchdogging” over those in *political* power, and which frequently references major, investigative scoops such as the Watergate scandal as examples of uncovering political wrongdoing. Our work, however, proposes a much broader understanding of watchdog journalism: namely, one that includes journalism-related scrutiny of scientific knowledge systems. This finding has significant implications for journalism theory, both in terms of how the watchdog role is being theorised, but also how it is being taught in journalism curricula at educational institutions. In approaching our work with an explicit de-westernising lens, we argue that it is increasingly important to recognise the global dimension of science watchdog journalism, including actors operating outside Western media systems.

That said, this study is not without its limitations. First, it is important to stress once again that the classification of actors (Table 1 and Supplementary Material) is not exhaustive but provisional. On the former, the rapidly evolving nature of platformised media and science accountability practices means that the list can expand at short notice; vice versa, some actors may not be able to sustain their venture due to lacking funding or outright threats to their work, as the case of *India Research Watch*, with its cross-over to whistleblowing practices, demonstrates (Chakrabarty, 2025). On the latter, the classification of some actors is provisional and partially contestable: Not all translation or amplification of research-integrity issues is necessarily equivalent to watchdog work in the closest sense of the word. Nevertheless, this study is the first of its kind to systematically map the emerging ecosystem of science watchdog journalism types, stratified across the various functions they fulfil. Second, although this study identifies actors across multiple global regions, the available material may still unevenly privilege initiatives with a stronger digital

footprint, greater visibility in international networks, or the capacity to publish in English. If, as was the case here, the study relied on English-language materials, this should be recognised as an important limitation, as it may have constrained the visibility of watchdog actors operating in other linguistic contexts and thereby underrepresented non-Anglophone forms of science accountability.

Overall, from what we can observe, the rapid proliferation of digital technologies has allowed scientific misinformation to flourish at-scale; has led to instances of scientific misconduct, e.g., in the form of so-called paper mills producing fake scientific papers on an almost industrial scale; and has further enabled AI-driven scientific manipulation, as evidenced by the rise of so-called “tortured phrases” describing nonsensical phrases acting as substitutes to established academic terminology. In line with this increase, we have identified several research avenues for future scholarly work. First, our classification model has emphasised these actors’ *primary* watchdog functions, but many also fulfil several roles concurrently. As such, a more exhaustive mapping that considers their numerous watchdog functions would be a worthwhile undertaking in future research. Following Bailey’s (1994) guidance on empirical taxonomy construction, future research could develop a typology of actors associated with science watchdog journalism, investigating organisational forms, the specific methodologies used by each of the actors, the degree of institutional recognition, and their funding models. Second, it would be especially interesting to analyse these actors’ closeness or distance to the journalistic core. For example, primary investigative watchdogs are the actors most critical of institutionalised science and scientists in our study. Does this mean they are closest to the traditional conception of the journalistic watchdog role? Situating these actors on an axis, demonstrating their positioning vis-à-vis the journalistic core, would also be especially interesting as it would help resolve conceptual and definitional ambiguities whenever we talk about peripheral actors, especially in light of previous research having found that these actors’ practice and self-presentation is not actually that peripheral, after all (Schapals, 2022). Third and final, our study clarifies the *who* (watchdog type) and *what* (watchdog function) of science watchdog journalism actors—but what’s thus far missing is the *why*: Why do these actors engage in science watchdog journalism, often in a voluntary capacity, and at times coming at a great personal cost, as those engaging in whistleblowing activities would testify? In-depth interviews with these actors would help shed further light on their motivations, and the broader, underlying ethos and ideology they carry.

With this in mind, we urge that journalism studies and science communication as disciplines take the emerging field of science watchdog journalism seriously as a distinct research domain—not least because maintaining public trust in science increasingly *depends* on these watchdog practices. As scientific authority becomes more contested in the digital age, the importance of science watchdog journalism will only continue to grow.

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Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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Bounded Watchdogging: Platform Governance, Risk Structures, and the Reconfiguration of Science Journalism

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Abstract

This article examines six cross-platform biomedical research-integrity controversies in mainland China to analyze how open-source investigation becomes integrated with journalistic verification under platform governance. Drawing on a research design that combines multiple qualitative methods such as digital trace ethnography, process tracing, and semi-structured interviews, the study identifies a four-stage process of science watchdogging: initial disclosure, verification and evidence accumulation, media intervention, and institutional response. This process shows how journalists use open-source information to conduct investigative science reporting. Building on these findings, the article further proposes a model of bounded watchdogging organized around trade-offs among speed, verifiability, and risk, showing how public-facing online leads and digital traces can be transformed into journalistic evidence. In this way, the findings not only offer journalists a practical verification pathway for producing science investigations, but also extend watchdog journalism theory beyond liberal-adversarial assumptions in the Chinese context.

Keywords

comparative journalism; open-source investigation; platform governance; science journalism; watchdog journalism

1. Introduction

In recent years, research retractions and scientific misconduct cases, especially in biomedical research, have increased globally, raising concerns about the credibility of science and its implications for public policy, health governance, social trust, and equality (“Why retractions data,” 2025; Van Noorden, 2023; Xie & Wang,

2025). Within the epistemology underpinning watchdog journalism, journalists and news organizations are expected to critique its norm violations and interrogate the institutional power relations that allow misconduct to persist; yet this role has been less systematically extended to academic research (Mede et al., 2025; Valinciute & Roßmann, 2025). This is partly because investigative reporting on academic issues requires substantial professional engagement and familiarity with scientific knowledge, academic norms, and professional ethics (Fleerackers et al., 2025). Consequently, journalists' investigative conclusions often depend heavily on third-party authorities, peer experts, and specialized literature (Crewdson, 1993; Fleerackers & Nguyen, 2024). Yet academic communities remain relatively closed, so even when misconduct occurs, it is often not discovered in time (Liskauskas et al., 2019).

The expansion of social media, online communities, and database websites has created a platform-based environment in which information about scientific misconduct can be disclosed, archived, circulated, and verified across sites. Investigative uses of these publicly accessible digital traces constitute open-source investigation (OSINV), in which journalists assemble fragmented online leads into verified evidence for watchdog reporting (Charlton et al., 2026). In science journalism, this process enables public participation as scientific insiders, domain experts, audiences, and other actors collaboratively contribute leads, documents, knowledge, and digital traces that journalists organize and verify as reportable evidence (Haim & Zamith, 2019). This multi-actor process links studies of collaborative journalism (Charlton et al., 2026; Dodds et al., 2025), verification (Zhang, 2023), and platform governance by showing how actors participate, how evidence is substantiated, and how platform structures enable or constrain such participation (Anter, 2026; Foxman et al., 2024). Among these domains, audience-facing social media platforms are particularly consequential, as they turn issues that might otherwise remain within scientific communities into publicly visible claims, and draw audiences into the evidence process from the outset. This configuration further raises epistemological concerns about how journalists allocate authority and negotiate among evidence, expertise, audience, and platform or institutional constraints.

Yet watchdogging and journalistic practice are always shaped by socio-political conditions. Compared with adversarial models often assumed in Western journalism studies (Ettema & Glasser, 1998), direct public criticism in mainland China may entail greater professional, institutional, and political sensitivity, especially when misconduct claims implicate scientific authorities, reputational hierarchies, or powerful institutions (He, 2008; Kuang, 2023). Platform governance therefore shapes how visibility, participation, and journalistic risk are managed. Mainland China thus offers a comparative context for examining how science watchdogging operates when public participation expands evidence-seeking while platform governance circumscribes journalistic action. Accordingly, this article asks how science watchdogging unfolds in practice, how journalists recalibrate epistemic authority, and how audience engagement shapes whether and how biomedical misconduct claims become publicly visible, contested, and accountable.

2. Literature Review

2.1. *The Watchdog Norm and Journalistic Professionalism*

Within modern journalism theory, the watchdog ideal has long been treated as a cornerstone of both journalistic professional norms and democratic legitimacy. Since the mid-20th century, the public standing of journalism has increasingly hinged on its capacity to scrutinize power, expose wrongdoing, and safeguard

the public interest. The rise of social responsibility theory, most notably associated with the Hutchins Commission (officially the Commission on Freedom of the Press), articulated this logic in institutional terms: The press was to be justified and sustained through a corresponding obligation to serve the public good, including the duty to monitor governments and other powerful actors (Commission on Freedom of the Press, 1947). As scholars such as McQuail have argued, the watchdog function is rooted in classical liberal conceptions of the relationship between state and society in which an autonomous press is expected to operate outside government to check and counterbalance power (McQuail, 2010). Within this normative framework, journalism is positioned as a “Fourth Estate”; that is, watchdog journalism is not merely an optional genre but a central mechanism through which democratic accountability is rendered visible and actionable (Veltmer, 1999).

As journalism became professionalized in the latter half of the 20th century, watchdogging was consolidated as a defining value of journalistic professionalism. Schudson (2008) argues that journalism’s institutional distinctiveness lies in its enduring critical function: Even when adversarial scrutiny is politically inconvenient, sustained questioning of power underwrites democratic life. In this tradition, investigative reporting is a professional stance. Ettema and Glasser (1998) show how reporters position themselves as “custodians of conscience,” legitimizing their work by exposing misconduct and pursuing accountability. Watchdogging thus emerges as a morally justified adversarial practice, grounded in professional obligation and oriented toward making power answerable through public visibility.

Importantly, the ability of journalism to function effectively as a watchdog has historically depended on the epistemic principles that underpin professional journalism. During the 20th century, as the field became more professionalized, core norms like objectivity, neutrality, fairness, and independence were formalized as the pillars of journalistic authority (Schudson, 1978). Within this framework, watchdog legitimacy rested less on adversarial posture than on impartiality, corroboration, and disciplined methods of verification (Grut, 2024). Objectivity thus came to signify a commitment to systematic verification rather than mere neutrality of stance. Over time, however, this epistemic model came under increasing scrutiny. Critics argued that claims to neutrality could mask structural inequalities or produce false equivalence, prompting renewed emphasis on transparency, methodological accountability, and the visible demonstration of evidentiary practice (Graves, 2017). This shift from neutrality to demonstrable evidence is especially important for watchdog journalism, because exposure depends not only on whether claims can be verified but also on whether they can be positioned as legitimate matters of public controversy.

Hallin’s (1986) distinction among the spheres of consensus, legitimate controversy, and deviance helps clarify this boundary condition. Journalistic norms operate differently across these spheres. Media typically reproduce dominant positions within the sphere of consensus and exclude claims located in the sphere of deviance; only within the sphere of legitimate controversy do principles such as objectivity and balance apply meaningfully. The watchdog function, therefore, depends not simply on journalists’ willingness to expose wrongdoing but on whether particular claims are recognized as legitimately contestable (Ettema & Glasser, 1998). From this perspective, news production is a boundary-making activity through which journalists participate in defining what counts as contestable, verifiable, and publicly reportable. In platform-based environments, these legitimacy boundaries become more fluid. Publicly accessible data and networked verification may expand the scope of legitimate controversy, while institutional governance and legal constraints may narrow or discipline it.

In science journalism, these dynamics are especially consequential because the boundary between consensus and controversy is commonly unstable under conditions of uncertainty and value contestation (Brüggemann et al., 2020). Textbook science is commonly treated as settled and anchored in expert authority, whereas frontier science is frequently uncertain, internally disputed, and publicly contested (Fleerackers & Nguyen, 2024). The movement of scientific disputes into the sphere of legitimate controversy is thus neither automatic nor stable. Although Hallin (1986) clarifies the structural differentiation of legitimacy, his framework offers limited guidance on how claims shift between spheres or how institutional routines, technological infrastructures, and verification practices actively construct and reconfigure these boundaries, particularly under contemporary digital conditions. Addressing these mechanisms is essential to understanding how science journalism negotiates its watchdog capacity today.

2.2. Collaborative OSINVs and Journalistic Epistemology

Within a platform-based environment such as social media platforms, ordinary users can disclose allegations, discuss and supplement clues, preserve digital traces, and interact with journalists, experts, and platform actors in the process of news production (Dodds et al., 2025). Under these conditions, OSINV can be understood as a participatory and collaborative form of investigative practice that provides traditional journalistic watchdogging with new channels and methods for verifying evidence. Scholars describe this shift as a “collaborative turn” in investigative journalism, mediated by digital platforms (Müller & Wiik, 2023), moving from relatively isolated work toward cross-organizational and cross-professional networks in which journalists and participants jointly gather and analyze data, while platforms provide the infrastructural conditions and space for coordination (van der Woude et al., 2025).

As OSINV becomes more prominent, journalists’ epistemic authority and role conceptions are being redefined. In traditional mass-communication paradigms, news media served as primary channels of reliable knowledge with journalists endowed with epistemic privilege and credibility. In platformized public spheres, however, this authority is increasingly destabilized by the rise of alternative actors, including platform influencers, citizens, and online communities, who command trust among segments of the public (Charlton et al., 2026). OSINV practices, in this sense, serve as watchdogs by leveraging publicly available data to expose wrongdoing, often addressing areas that under-resourced newsrooms cannot fully cover. Under these conditions, professional journalism shifts from a gatekeeping to a gatewatching role (Zhang, 2023), curating and integrating publicly verified materials into broader arenas of public scrutiny, thereby prompting a recalibration of core professional norms.

Within this collaborative configuration, journalism’s epistemic framework is reshaped (Mohamedy & Wandwi, 2025). Whereas objectivity has often been associated with neutrality, in platform-based environments its authority increasingly depends on whether journalists can make their verification process visible and open to scrutiny (Charlton et al., 2026). OSINV gives practical form to this shift by foregrounding publicly accessible data, traceable evidence, and replicable verification procedures. Journalists document this process by explaining where evidence comes from, how it is checked, what uncertainties remain, and how interpretive judgments are made (Dodds et al., 2025; Dubberley et al., 2020). In this sense, the collaborative turn marks a broader shift from neutrality as a professional stance to verifiability as journalistic practice, redistributing epistemic authority among journalists, online participants, and platforms.

Prominent OSINV cases clarify how this reorientation works. These investigations often begin with platform-based traces, such as social media posts, images, videos, and online discussions, and rely on other open-source tools to corroborate and contextualize those materials. In the Malaysia Airlines Flight 17 investigation, for example, Bellingcat combined social media images and videos with open maps, satellite imagery, and geolocation techniques to reconstruct the movement of a missile launcher and present a traceable evidence chain (Higgins, 2021). During the Russia–Ukraine war, open-source investigators have similarly cross-checked videos circulating on platforms against satellite imagery, geolocation data, and weapons databases to document troop movements and civilian harm, at times supplementing or preceding newsroom reporting (Charlton et al., 2026). These cases show that OSINV is not only a toolkit but also a mode of verification in which platform-based traces are corroborated through open-source methods. By making evidence chains transparent, OSINV can move disputed claims into the sphere of legitimate controversy, even as that legitimacy remains shaped by institutional and regulatory constraints (van der Woude et al., 2025).

Overall, OSINV practices reshape journalist–public interactions and reconfigure the epistemological foundations of professional authority, shifting it from a closed institutional ethic to a publicly demonstrable logic of verification (Charlton et al., 2026; Mohamedy & Wandwi, 2025). Meanwhile, the boundaries of legitimate controversy are embedded within broader political and cultural orders (Dovbysh & Somfalvy, 2021). Socio-cultural norms and institutional arrangements shape how journalists deploy open-source tools, define factual claims, and negotiate public participation. Epistemic renewal, therefore, cannot be understood apart from the political and cultural contexts within which watchdog journalism operates. Empirical analysis must therefore situate OSINV within its specific institutional and societal setting.

2.3. Chinese OSINVs in Journalism Practices

Compared with the liberal watchdog model of investigative journalism, grounded in independence and adversarial practice, investigative reporting in China is embedded in a more complex assemblage of professional values. As Lin’s (2010) research suggests, Chinese journalists are shaped simultaneously by Western journalistic professionalism, the literati tradition, and Party-press values, three repertoires that coexist throughout processes of professionalization. Western journalistic professionalism, particularly its US variant, has exerted a lasting influence on Chinese journalists’ professional self-understanding by framing journalism as a distinct occupation committed to objective, neutral, and transparent reporting (Hassid, 2011). The literati tradition, rooted in Confucian thought, positions journalists as public-minded intellectuals with moral responsibility and a duty to speak for the people (Lin, 2010). This value orientation encourages moral concern and civic engagement, legitimizing exposure of wrongdoing as a form of accounting journalism intervention. At the same time, the Party-press also expects journalists to act as guides of public opinion in service of governance and social order (Long & Shao, 2023). The coexistence of these value systems produces distinctive tensions, making watchdog journalism in China a constrained practice of “dancing in shackles” (He, 2008, p. 100).

Hassid’s typological analysis further captures this complexity by delineating four ideal-type orientations among Chinese journalists—Communist professionals, workaday newswriters, advocate professionals—and American professionals, indicating that journalists cannot be reduced to a single role as executors of Party media (Hassid, 2011). Rather, they may shift between Party-centered news conceptions and Western-style

professional norms, or adopt an advocacy mode situated between serving as an official mouthpiece and acting as a public representative. In practice, the same journalist often adjusts reporting strategies across contexts, so professionalism in China appears more as a malleable resource disciplined by institutional conditions (Mertha, 2009). In other words, journalists may alternately function as proponents of Party lines and, when political space permits, as watchdogs who expose problems, enabling them to pursue professional ideals within bounded discretion while avoiding transgression of non-negotiable political lines. These institutional conditions also differ across organizational forms (Xi et al., 2021). Compared with Party media, commercial media are more exposed to market competition and audience pressures and may therefore be more willing to pursue investigative reporting within politically permissible boundaries (You et al., 2018).

In China, content that could provoke strong audience dissatisfaction or collective mobilization is politically sensitive and may expose journalists to political and professional risks (Kuang, 2023). Journalists therefore negotiate the boundaries of permissible watchdogging with official authorities while aligning their work with the broader priorities of state governance and social stability. In platform-based environments, these boundaries are further shaped by the infrastructures through which information circulates and becomes visible (Long & Shao, 2023). Through algorithmic distribution, moderation, account management, and traffic control, platform governance may limit how watchdog reporting evolves into broader criticism of governance (King et al., 2013). Under these conditions, journalists must preserve professional credibility through multi-source verification while carefully managing tone, attribution, and visibility to reduce political and occupational risks. Watchdog journalism in China therefore depends on sustaining evidentiary rigor without turning oversight into direct confrontation with public authority.

Importantly, criticism of public authorities or governance is not automatically prohibited; rather, it operates within a shifting and often narrow temporal window. As King et al. (2013) demonstrate, sharp criticism may remain online for a period, yet once a topic signals mobilization, intervention tends to be swift and stringent. Consequently, journalists must act rapidly within this temporal window, navigating algorithmic visibility and moderation regimes to sustain circulation while ensuring evidentiary robustness to minimize legal and reputational risks. Watchdogging journalism in China therefore operates within differentiated risk structures, in which risk takes a more complex configuration: It encompasses not only professional risks, such as misinformation or reputational damage, but also political risks, including the possibility that reporting may be read as challenging governance legitimacy, enabling public dissatisfaction, or collective mobilization (Hassid, 2011). These risks define the temporal windows, evidence standards, and attribution boundaries within which watchdogging can be exercised.

Science journalism is a critical site for theorizing OSINV under platform governance. On the one hand, it raises questions central to journalistic professionalism, including transparency, objectivity, and the verification of specialized knowledge. On the other hand, scientific controversies cannot be reduced to purely technical disputes (Liskauskas et al., 2019; Vestergaard, 2017; Yeo et al., 2017). Such controversies often extend beyond expert domains, implicating epistemic authority, ethical responsibility, audience participation, and broader societal consequences (Fleerackers & Nguyen, 2024). Science watchdogging thus emerges as a boundary-making practice through which journalists, experts, and publics negotiate what can be publicly challenged.

3. Methodology

To examine the process of science watchdogging, journalists' calibration of epistemic authority, and the role of audience, this study selected six prominent cases from 2021 to 2025. All cases involved insider disclosures, audience participation, journalistic intervention, and formal responses from relevant authorities or institutions. They also involved contested allegations of biomedical misconduct, requiring journalists to manage both evidence risks in verification and socio-political risks stemming from scrutiny of institutional responsibility and public authority. Methodologically, the study combines digital trace ethnography, process tracing, qualitative framing analysis of audience comments, and semi-structured interviews to reconstruct how OSINV unfolded across the six cases.

3.1. *Sampling and Platform-Based Digital Data*

The six cases are the Shaanxi University of Traditional Chinese Medicine “Shared Tablecloth” case (2021), the Xi'an Jiaotong University “Data Fabrication” case (2022), the “Scratched Ruler” image duplication case (2023), the Huazhong Agricultural University “Supervisor case” (2024), the Fujian University of Traditional Chinese Medicine “Male Endometriosis Sample” controversy (2025), and the Peking Union Medical College “4+4” controversy (2025; hereafter referred as Tablecloth, Data Fabrication, Scratched Ruler, Supervisor case, Male Endometriosis Sample, and 4+4 Controversy). All cases involved biomedical misconduct, requiring journalists to manage both evidence risks during verification and political risks stemming from scrutiny of institutional responsibility and public authority.

Briefly, the Tablecloth case concerned papers from Shaanxi University of Traditional Chinese Medicine that were alleged to have reused the same experimental images as multiple other papers, with even the background tablecloth appearing highly similar. The Data Fabrication case concerned allegations that Shan Tao, an associate chief physician affiliated with Xi'an Jiaotong University, fabricated and altered research data in published papers. The Scratched Ruler case involved four papers from Jilin University, the First Hospital of Lanzhou University, and the Affiliated Hospital of Qingdao University that were reported to contain duplicated images featuring the same scratched steel ruler, three of which have been retracted. The Supervisor case involved allegations that a Huazhong Agricultural University supervisor coerced students and altered research data. The Male Endometriosis Sample case concerned papers by two gynecologists from the People's Hospital Affiliated to Fujian University of Traditional Chinese Medicine that included male patient samples, such as “male uterine fibroids,” which contradict basic medical knowledge. The 4+4 Controversy involved questions about medical publications, student training procedures, and the fairness of an accelerated medical-doctorate pathway. Detailed case information is presented in Table 1 in the Supplementary File.

To construct the digital trace dataset, the researchers followed a digital trace ethnographic approach to locate each case's earliest traceable disclosure post and used it as an anchor to identify, record, and collect relevant materials page by page. To minimize the risk of missing key materials and timeline events, the research team manually reviewed the platform pages of each case from the initial disclosure onward and combined this process with keyword searches, snowball tracing from platform posts, media reports, and official statements. Collection continued until no new unique materials or timeline events were found. The archived data included the initial disclosure, the collection of structured evidence, the first media report,

platform deletion or restriction, cross-platform archiving, and the official statements. Additionally, the researchers used Python-based scripts to structurally collect audience replies from the most visible, high-engagement threads at key moments in each case; after cleaning, deduplication, and screening, the final dataset comprised 42,375 comments.

These materials were then analyzed inductively. The researchers first reconstructed each case's timeline through process tracing and conducted qualitative framing analysis through open coding and axial coding of the materials to refine recurring patterns across the six cases. Finally, these materials were organized into three analytical dimensions: temporal sequencing, evidence accumulation, and platform-audience dynamics. These dimensions capture, respectively, the temporal window of watchdogging, the evidentiary work by which online traces become journalistic evidence, and the platform-audience interactions that shape visibility, preservation, and public scrutiny.

To make the inductive findings comparable across cases, the three analytical dimensions were operationalized into descriptive indicators, providing a structured rather than statistical comparison of how verification unfolded across the three risk configurations (Table 1). Specifically, time-related indicators were

Table 1. Operational indicators of risk-differentiated verification dynamics.

Dimension	Indicator	Data Source	Low Risk	Medium Risk	High Risk
Temporal sequencing	Time to first structured evidence	Comment timeline	Mean = 2.5 hrs Range = (0–3.9)	Mean = 5.8 hrs	Mean = 18.4 hrs
	Time to first media report	Media timeline	Mean = 1.2 days Range = (0.8–1.6)	Mean = 3 days	Mean = 6 days
	Official response time	Official accounts	Mean = 3 days Range = (2–4)	Mean = 15 days	Mean = 18 days
Evidence accumulation	Type of triggering material	Content coding	Textual	Textual	Mixed/institutional
	Number of evidence operations	Comment coding	Mean = 3 Range = (2–4)	Mean = 8	Mean = 17
	Independent validations	Media coding	Mean = 2 Range = (1–3)	Mean = 9	Mean = 22
	Media uptake of sourced evidence	Media coding	81.2%	56.4%	40.5%
Platform-audience dynamics	Deletion or restriction events	Platform traces	Mean = 44 Range = (31–57)	Mean = 76	Mean = 208
	Archival or mirroring actions	Cross-platform traces	Mean = 11 Range = (7–15)	Mean = 56	Mean = 124
	Dominant audience frame	Comment coding	Technical	Mixed	Institutional Legitimacy

Note: Ranges are shown only where multiple cases are included (low risk).

derived from platform records, media reports, and official statements; evidence and platform-related indicators were coded as observable events and summarized as counts or proportions; and the audience indicator was coded as a categorical frame based on comment threads. A technical frame refers to comments that focus primarily on the alleged misconduct itself, such as textual, image-based, data-related, authorship, or procedural problems. A power-relational frame refers to comments that link the case to academic hierarchy, dependency, supervisor-student relations, or unequal distribution of credit and responsibility. An institutional-legitimacy frame refers to comments that link the controversy to institutional credibility, public resource allocation, governance responsibility, or public authority. Together, these indicators show how the timing of disclosure and response, the accumulation of evidence, platform intervention, and audience framing varied as cases progressed from technical misconduct (low risk) to power asymmetry (medium risk) and institutionally sensitive controversies (high risk).

3.2. Semi-Structured Interview Data

To capture both journalistic judgment and platform governance constraints, the study also conducted 28 semi-structured interviews with 16 journalists (from both traditional newspapers and commercial digital media), eight volunteer archivists involved in evidentiary preservation, and four practitioners engaged in platform governance. Table 2 provides an overview of the interview participants. Journalists were identified through bylines on relevant reports and contacted directly; archivists were invited via private messages on social media platforms; and platform governance practitioners were recruited through professional referrals. Interviews were conducted via social media (Weibo, WeChat) or by telephone. The interview questions included: (a) how open-source materials are assessed for credibility; (b) standards for sufficient verification and attribution; (c) editorial, legal, and cross-checking routines; (d) how platform and legal risks shape timing and exposure intensity; and (e) how user-generated evidence and audience sentiment are managed in reporting. All participants gave informed consent to be interviewed, participated voluntarily, and had all identifying information anonymized. Ethics approval was obtained from the researchers' workplace.

Table 2. Overview of interview participants.

Categories	Subcategory	No.	Platform/Organization
Journalists	Traditional media	9	<i>Southern Metropolis Daily; Jiefang Daily</i>
	Commercial digital media	7	<i>Jiemian News; The Paper</i>
Volunteer archivists	Social media	8	Weibo; Zhihu; WeChat
Platform governance practitioners	Social media platforms	4	Weibo; Zhihu; WeChat

4. Analysis and Findings

Building on the foregoing analysis, this section develops three interrelated analytical levels to explain how scientific controversies are transformed into institutional accountability under differentiated risk structures. First, we reconstruct the verification process linking initial disclosure, outlining the structural sequence by which digital traces are translated into formal accountability. Second, we identify risk-differentiated epistemic configurations through cross-case comparison, demonstrating how verification is adjusted across varying levels of institutional sensitivity through trade-offs among speed, verifiability, and risk. Third, we analyze the mediated role of audiences within platform governance. These three analytical layers reveal OSINV in science as a bounded and dynamically negotiated practice in the Chinese context.

4.1. Cross-Verification: Processual Structuring of Accountability

This study identified a consistent four-stage verification process across the six cases examined: (a) initial disclosure; (b) verification and evidence accumulation; (c) media intervention; and (d) institutional response. Although each controversy unfolded under distinct institutional and risk conditions, the sequence by which allegations developed into formal accountability displayed a recognizable structural pattern. Rather than emerging solely from professional newsrooms, investigative momentum was initiated by publicly circulated disclosures, intensified by distributed evidence labor, consolidated through structured journalistic reporting, and ultimately culminated in official action. This staged progression reveals a coordinated process in which professional journalism becomes sequentially integrated, forming a reproducible pathway from allegation to institutional response.

The first stage was initial disclosure. Across all six cases, initial allegations were gathered using a shared “trace kit” of platform-native techniques: timestamped posts, screenshot bundles, persistent identifiers (e.g., DOIs), hyperlink chains, and cross-platform reposting that preserved provenance and enabled rapid circulation. What varied systematically was not the availability of these techniques but their intensity and redundancy across different risk levels. In low-risk, text-based misconduct cases, disclosures were typically evidence-focused and detailed, often including side-by-side comparisons, DOI tracing, and direct links to publication records. In medium-risk cases involving power asymmetries, the same toolkit was deployed more heterogeneously, combining documentary fragments (policies, notices, communications) with initially unstructured allegations that required later cross-referencing to stabilize what counted as “evidence.” In high-risk, institutionally sensitive cases, disclosure practices became more cautious and defensive: Posts were more frequently mirrored, archived, or duplicated preemptively in anticipation of deletion or moderation. In all cases, this stage produced the initial evidence anchors around which subsequent accumulation unfolded.

The second stage is verification and evidence accumulation. Following initial disclosure, verification proceeded under a structured yet distributed evidence protocol. Across cases, actors followed a recurring sequence of operations: (a) identifier tracing (DOI and database cross-checking); (b) metadata and image comparison (file properties, duplication detection, version-history inspection); (c) hyperlink persistence testing and cross-platform corroboration; (d) archival preservation (screenshot bundling, mirroring, and cache retrieval); and (e) independent validation through expert consultation or off-platform confirmation. Volunteer archivists frequently stabilized volatile traces, while journalists replicated key checks to consolidate multi-source evidence chains. What varied across risk levels was the density and sequencing of these operations. In low-risk cases, verification remained largely technical and document-centered, often resolved through direct textual comparison and database cross-referencing. Medium-risk cases required broader evidence triangulation, integrating policy texts, employment records, and procedural timelines. High-risk cases demanded multi-layered validation, including source authentication, off-platform consultation, and cautious attribution strategies, often extending the verification cycle (Mohamedy & Wandwi, 2025). Generally, this stage transformed scattered digital traces into structured, cross-validated evidence that supported formal media intervention.

The third stage is media intervention. Media intervention marked the transition from distributed evidence accumulation to structured reporting. The first formal news article served as a stabilizing moment,

consolidating dispersed traces into a structured account with explicit sourcing and attribution. Journalists synthesized publicly generated materials, independently verified key claims, and calibrated language according to perceived legal and institutional sensitivity. Hyperlinks, archived screenshots, and expert quotations were selectively incorporated to render the evidence chain legible while maintaining editorial responsibility. Across risk levels, differences emerged in attribution strategy and evidence positioning. In low-risk cases, media reports more directly identified misconduct and cited documentary evidence with minimal hedging. Medium-risk cases required more cautious phrasing and multi-source confirmation, often contextualizing allegations as procedural irregularities. High-risk cases involved layered validation and delayed publication, with journalists carefully sequencing claims, consulting institutional representatives, and avoiding definitive attribution until further confirmation. Through this stage, distributed verification was translated into institutionally accountable reporting.

The fourth stage is institutional response. The institutional response marks the transition of the verification process from the media agency to formal governance structures. All six cases elicited varying degrees of official reaction following media reporting, including investigations, public statements, disciplinary measures, or credential-related decisions. Low-risk cases typically led to individual-level accountability, such as formal demerits or public apologies. Medium-risk cases required more complex organizational procedures, including internal reviews or position adjustments. High-risk cases resulted in more severe consequences, including degree revocation, paper retractions, or the cancellation of professional licenses. The timing and intensity of institutional responses varied significantly across risk levels. A common pattern, however, was that official action generally followed structured media intervention, indicating that formal reporting served as a critical juncture for translating distributed allegations into institutional accountability. At this stage, the digital traces generated by the initial disclosure, after verification and reporting, became embedded within formal governance mechanisms.

These four stages constitute a reproducible verification pipeline linking citizen-led disclosure, distributed evidence accumulation, structured media intervention, and institutional response. This sequence remained remarkably stable, even as duration, evidence density, and attribution strategies varied systematically with institutional sensitivity. Low-risk cases moved rapidly from technical verification to direct reporting and limited sanctions, whereas high-risk cases involved prolonged validation, layered sourcing, and delayed institutional outcomes. These patterned variations suggest that while the process enhances journalism's capacity to transform digital traces into institutional consequences, it also reveals implicit trade-offs: speed against confirmability, evidence transparency against attribution caution, and rapid exposure against institutional traction.

4.2. The Trade-Off: Risk-Differentiated Epistemic Verification

Building on the previous comparative analysis, we outline a risk-based epistemic configuration for verification. Across cases, the complexity of evidence accumulation, the sequencing of attribution, and tolerance for publication delay, reflected in progressively longer mean reporting lags across risk levels, were systematically calibrated against perceived institutional sensitivity and projected sociopolitical ramifications. Verification was not merely a technical exercise in fact-checking but a form of epistemic navigation under risk conditions. As sensitivity increased, verification became more layered, more anticipatory, and more oriented toward managing downstream contestation. In this sense, journalistic verification functioned as a

risk-calibrated practice of responsibility, in which decisions about speed, attribution, and evidence sufficiency were continuously adjusted in relation to political implications and platform amplification dynamics.

In low-risk cases of textual academic misconduct, verification adopts a distinctly professional-technical orientation. These controversies typically center on discrete, self-contained factual irregularities, such as plagiarism, duplicate publication, or citation manipulation, with the scope of dispute clearly defined and institutional sensitivity relatively limited. In these contexts, journalists rely primarily on integrating technical evidence and conducting procedural cross-checks to transform open-source materials into structured chains of verifiable facts. Attribution is generally direct, publication timelines are comparatively swift (Mean = 1.2 days; Range = 0.8–1.6), and the reporting tone is less defensive. As one interviewee noted, “When evidence can be clearly traced, the reporting itself becomes more transparent and credible.” From an epistemological standpoint, this approach embodies what could be called a certificatory professional logic. News outlets convert publicly available clues into institutionally recognizable facts via procedural objectivity and transparency of evidence, ensuring targeted accountability. In this framework, verification mainly acts as confirmation rather than broadening the scope of legitimate debate.

In contexts marked by pronounced power asymmetries, such as hierarchical supervisor–student relationships, verification shifts from mere technical confirmation to responsibility-sensitive calibration. Allegations in these contexts involve unequal authority, reputational stakes, and potential harm to vulnerable actors, prompting journalists to raise evidence thresholds and rely on multi-source validation. For example, in the Supervisor case, interviewees frequently invoked concerns of fairness, responsibility, and the need to protect vulnerable individuals, with some describing students’ disclosures as “suicidal reporting” requiring careful handling. Such language resonates with the literati-inflected moral orientation identified in prior scholarship on Chinese journalism, in which journalists are imagined as bearers of ethical responsibility. Importantly, these moral commitments were not expressed through overt advocacy but translated into stricter evidence standards and calibrated attribution. Misconduct was framed in terms of procedural or ethical irregularities, avoiding expansive systemic claims. Epistemologically, this configuration reflects a hybrid mode: Procedural rigor remains central, yet verification is tempered by relational moral considerations. Watchdogging journalism thus sustains scrutiny while mitigating relational harm and potential escalation.

In cases where controversies further escalate into questions of institutional or public governance, the logic of verification shifts markedly. Such high-sensitivity cases extend beyond individual academic misconduct to implicate broader structural issues, including educational equity, public trust, and the design of institutional authority, thereby significantly increasing legal exposure and potential sociopolitical repercussions. Under these conditions, verification is no longer confined to confirming factual accuracy; it becomes a forward-looking exercise in risk management. As several interviewees noted, reporting on public institutions required careful calibration of wording and attribution boundaries: “When checking facts, we have to anticipate how different audiences, especially regulators, might interpret them.” Another journalist observed that such cases could quickly amplify public dissatisfaction, making it necessary to weigh “every word against its possible amplification.” Accordingly, although evidence standards remained rigorous, attribution became more cautious, publication timelines lengthened substantially (Mean = 6 days at high risk compared to an average of 1.2 days at low risk), attribution boundaries narrowed, and controversies were framed as discrete, administratively rectifiable issues rather than systemic legitimacy crises. Epistemologically, this

mode combines procedural rigor with relational sensitivity: Watchdogging journalism sustains scrutiny while containing escalation.

Comparative analysis of the three configurations shows a systematic reordering of speed, verifiability, and safety as risk intensifies. In low-risk contexts, speed and verifiability rise together, with minimal safety constraints. In power-asymmetry cases, verifiability becomes the pivot balancing tempo and relational risk. In high-sensitivity cases, safety takes precedence: publication is delayed, attribution is narrowed, and exposure is strategically modulated, even as formal evidence standards remain high. These shifts suggest that verification is not simply the determination of truth but a risk-calibrated epistemic practice. Risk does not eliminate watchdog journalism; it reshapes its pace, thresholds, and attribution strategies. This dynamic reordering reflects the negotiated character of Chinese watchdogging journalism, situated at the intersection of professional norms, literati moral responsibility, and governance pragmatism. Professionalism ensures evidentiary rigor, the literati ethos upholds commitments to fairness and justice, and governance considerations limit attribution and exposure. What emerges is not a retreat from oversight but a structured compromise in which watchdog capacity becomes an adjustable configuration, mediating among verification, moral obligation, and institutional sustainability rather than embodying a purely adversarial ideal.

4.3. Audience Mediation: Platform Governance and the Politics of Visibility

Building on the risk-differentiated configuration of verification identified above, our analysis suggests that one crucial mediating variable in this calibration process lies in the anticipated dynamics of audience response. The prioritization of speed, verifiability, and safety is continually shaped by journalists' expectations of how different publics might interpret, amplify, contest, or escalate particular claims. Across interviews, actors repeatedly emphasized that verification decisions were also made in assessing audience reaction, which is understood as a form of risk assessment, through which journalists evaluate how audience responses may affect visibility, platform moderation, institutional pressure, and the escalation of controversy. In this sense, the audience functions as a structuring coordinate within risk-calibrated accountability practice. The boundaries of legitimate controversy, previously discussed in relation to institutional and political constraints, are thus further mediated by perceptions of audience mobilization and platform amplification.

Among the actors participating in this mediated calibration process, volunteer archivists occupy a structurally significant position by stabilizing the verification procedure. Through systematic archiving, mirroring, and cross-platform reposting, archivists preserve volatile digital traces that might otherwise disappear under moderation pressure or rapid circulation. As one archivist explained, "If we do not screenshot it immediately, it might be gone within minutes." Such practices reduce evidence fragility and extend the temporal window within which verification can proceed. Their engagement is not purely technical. Several interviewees framed archiving as a normative act: "Science should be science," one biomedical researcher noted, emphasizing the need to defend disciplinary integrity. Another archivist stated, "If people outside academia can see the evidence clearly, maybe institutions will have to respond." These motivations, however, translate into concrete infrastructural effects. By anticipating deletion, throttling, or reputational backlash, archivists introduce redundancy into the evidence chain, thereby mitigating downstream risk in the accountability process. In this sense, they function as distributed custodians of evidence durability, shaping not only what can be verified but also how long verification remains possible.

For open-source investigative journalists, the audience functions not only as a recipient but as an evaluator and anticipatory variable in risk calibration. Interview data show that journalists differentiate among multiple audience constituencies, online commentators, professional communities, institutional stakeholders, and regulators, each carrying distinct interpretive and political implications. As one journalist noted, “Before publishing, we always ask: Who is going to read this first, and what will they do with it?” In lower- or medium-risk cases, journalists often align with audience framing when public interpretation reinforces clear evidence of misconduct; for example, in the Supervisor case, reporters adopted the audience’s “victim” role and regarded their reporting as a responsibility to “speak for the vulnerable.” However, when online accusations became excessive, tone was recalibrated; in 4+4 Controversy, an editor observed that “some accusations online were too extreme, and if we simply echoed them, it would escalate unnecessarily.” In such contexts, attribution and sequencing were adjusted to prevent amplification beyond manageable bounds. These findings indicate that verification thresholds, publication timing, and attribution decisions are shaped not only by evidence sufficiency but also by anticipated audience reaction and regulatory sensitivity.

From the perspective of platform governance practitioners, audiences are expressive populations subject to monitoring and regulation. Interview data indicate that tolerance thresholds are shaped by the perceived controllability of discourse. As one practitioner noted, “It’s not only about whether something is true, but whether it remains manageable.” When user expression remains within moderated bounds and is supported by structured evidence, platform affordances, such as recommendation and trending mechanisms, may amplify visibility. However, once discourse becomes emotionally escalatory or institutionally accusatory, moderation intensifies. One practitioner described moments when discussions “spill over,” prompting deletion, throttling, or algorithmic de-prioritization. In high-sensitivity cases, even professionally composed posts risk restriction if circulation accelerates too rapidly. Platform governance thus actively structures the visibility horizon within which both journalistic and public expression operate. These dynamics show that OSINV is also shaped by expected audience engagement and platform governance limits, making watchdog roles a shared product of journalists, the public, and governance structures.

Taken together, the verification procedure, the risk-differentiated epistemic modes, and the mediated role of audiences reveal that watchdogging journalism operates under layered and conditional constraints. Watchdog practice does not disappear amid heightened sensitivity; rather, it is adjusted across thresholds of institutional risk, audience anticipation, and platform governance. The capacity to scrutinize power is thus neither uniformly adversarial nor structurally fixed, but contingent upon negotiated boundaries of evidence, attribution, and visibility. Understanding contemporary watchdog journalism, therefore, requires attention not only to normative ideals but to the bounded and dynamically mediated conditions under which those ideals become actionable.

5. Discussion and Conclusion

Drawing on six cross-platform biomedical research controversies in China and integrating multiple qualitative methods, this article reconstructs a four-stage watchdog verification process: initial disclosure, verification and evidence accumulation, media intervention, and institutional response. This process offers journalists an actionable OSINV workflow for reporting academic misconduct, showing how scattered online claims can be traced, corroborated, translated into reportable evidence, and connected to institutional response. It also proposes a model of bounded watchdogging, suggesting that journalistic oversight operates

through trade-offs among speed, verifiability, and risk. Audience response conditions watchdogging on timing, evidence, attribution, and visibility. This approach provides an alternative to liberal-adversarial views of watchdog journalism by demonstrating how accountability is maintained within professional, platform-based, and political constraints.

The core mechanism of bounded watchdogging is a trade-off among speed, verifiability, and risk. Across differentiated risk conditions, journalists sustain scrutiny by adjusting when misconduct claims are made visible, how they are evidenced, and how responsibility is attributed. These adjustments, however, do not make verification less rigorous; rather, they reorganize rigor through layered evidence, traceable documentation, cautious wording, and acknowledged uncertainty. Such reorganization marks an epistemic recalibration of journalistic authority, in which objectivity and credibility depend more on transparent, verifiable, and traceable evidentiary practices. Audiences are also central to this process, because they stabilize traces, amplify claims, and condition the visibility and contestability of biomedical misconduct, while also entering journalistic and platform risk calculations. In this sense, watchdogging becomes a bounded form of public participation evidence work, dynamically balanced between collaborative knowledge production and institutional constraint.

Theoretically, the model enriches our understanding of watchdogging by showing how journalistic professionalism, platform governance, and power structures are negotiated under differentiated institutional and regulatory conditions. As a distinctive model within the broader spectrum of journalistic professionalism, the Chinese case offers a comparative site for examining how watchdogging journalism operates beyond the Western liberal watchdog model. Additionally, it extends our understanding of Hallin's (1986, p. 117) "sphere of legitimate controversy" from a spatial metaphor into a three-dimensional operation. Legitimacy in platform space is not just about whether an issue can be debated. It also depends on stabilizing evidence, maintaining attribution, ensuring dissemination stays within governance limits, and enabling interventions within tight timeframes. Legitimate controversy thus becomes a dynamically negotiated boundary environment co-produced by journalists, audiences, platforms, and institutional sensitivity. In doing so, the article integrates participatory journalism, verification research, and platform governance scholarship into a unified boundary-producing mechanism in the context of the Global South.

The article also contributes to journalistic practice, especially in OSINV science journalism, by outlining how platform-based disclosures can be transformed into actionable reporting through professional verification. Rather than functioning merely as a set of digital tools before publication, OSINV supports a four-stage reporting process in which journalists monitor public disclosures, preserve digital traces, verify open-source evidence, assess attribution, and manage the visibility of contested claims. Science journalism controversies are especially useful for observing this process because they span expert domains and public platforms, requiring journalists to handle technical evidence, audience participation, institutional statements, and questions of public accountability simultaneously. This article, therefore, shows how science watchdogging can be organized as a professional workflow for turning platform-based disclosures into accountable public knowledge without sacrificing evidentiary rigor.

This study also has limitations. The model of bounded watchdogging is derived from six biomedical research controversies in mainland China, where journalistic watchdogging is shaped by platform governance, institutional sensitivity, and the political management of public visibility. It should therefore be understood as

a context-sensitive model rather than a general account of investigative journalism or a direct counterpart to the liberal-adversarial watchdog models. Future research could extend this model through comparative media system analysis by asking under what institutional, legal, and platform conditions bounded watchdogging emerges, and how different media systems reorder trade-offs among speed, verifiability, and risk. Additionally, this study primarily focuses on public-facing social media platforms; future research could compare them with specialist databases or forums to examine how different platform environments organize participation and shape evidence work. Finally, research retraction cases often involve relatively clear evidence and identifiable pathways for institutional response. More uncertain scientific controversies may generate different patterns of verification and risk management. These questions all warrant further examination.

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Conflict of Interests

The authors declare no conflict of interest.

Data Availability

The content data that support the findings of this study are available from the corresponding author upon reasonable request. The interview data of this study are not publicly available due to ethical restrictions.

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ChatGPT was used to assist with language editing of the manuscript. The authors reviewed and take full responsibility for the final content.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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Watchdog Science Journalism: How Retraction Watch Fosters Accountability in Science

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Abstract

Although science reporters have long been urged to adopt the role of the journalistic watchdog, scholars have not extensively examined how this role can be understood conceptually or in practice. This exploratory case study examines Retraction Watch, founded in 2010, as an illuminating example of watchdog science journalism that holds science to account around the epistemological claim, central to science’s cultural authority, that it is self-correcting. Drawing on a thematic analysis of interviews with senior staff at the site and scholars who study retractions, the study finds that the site has undertaken accountability journalism of the little-scrutinised phenomenon of retractions, has reported systematically on retractions, has questioned and determined the reasons for retractions, has created a database of retractions to aid science in its self-correction, and has provided knowledge-based journalism for its specialist public interested in scientific integrity. The article argues that Retraction Watch has expanded beyond journalism to operate as a novel journalistic hybrid institution that combines science journalism with the scientific infrastructure of its database, activities underpinned by a normative value of accountability. As a journalistic hybrid institution, it illustrates what future organisational forms of science journalism might look like.

Keywords

accountability journalism; journalistic hybrid institution; research integrity; retraction; science journalism; watchdog science journalism

1. Introduction

Scholars and journalists have for decades called for science reporters to be more critical of science (Kiernan, 2022; Murcott, 2009; Nelkin, 1995). These calls have come in a context where science journalism has

tended historically to conform to a transmission communication model in which reporters faithfully relayed information from science to the public (Trench, 2007), resulting in reporting that was too supportive of the scientific enterprise. One proposed way for journalists to adopt a more critical orientation is by undertaking the watchdog role, which holds “scientists, scientific institutions, industry and policy-oriented organisations to scrutiny” (Fahy & Nisbet, 2011, p. 780). But there has been little examination of what this role entails and how its methods and processes can hold scientists accountable to citizens who fund research through taxation and rely on science as a guide to personal and political decisions. These calls, therefore, confront the conceptual problem that it is not clear how the phenomenon of watchdog science journalism can be understood theoretically or in practice, especially in a digital era of changing roles, emergent practices, and new organisational forms of journalism.

One outlet that can illuminate the phenomenon is Retraction Watch, recurrently described with reference to the watchdog role. Founded in 2010, it reported from its inception on retractions, published notices in academic journals stating that a paper had been formally withdrawn from the scientific record. It later developed the first comprehensive database of retractions that it made available as an open research resource for the scientific community. The site has been described as producing “watchdog science journalism” (Mede et al., 2025, p. 1) and has been categorised as a new type of “watchdog” organisation that emerged in the digital era to monitor scientific publishing (Biagioli & Lippman, 2020, p. 17). Such scrutiny matters for public trust in science, as the public legitimacy of science is connected to the legitimacy of science publishing (Csiszar, 2020). In this study, I identify and analyse the central characteristics and core processes of Retraction Watch to illuminate the phenomenon of watchdog science journalism. I argue that Retraction Watch is a journalistic hybrid institution that combines science reporting with the research infrastructure of its retraction database to foster accountability in science, guided by the normative value of accountability. I argue that the hybrid form enables the site to hold science to account around the epistemological claim, central to the cultural authority of science, that the institution of science is self-correcting.

2. Literature Review: Watchdog Science Journalism, Retractions, and the Journalistic Hybrid Institution

Because so few studies have addressed watchdog journalism, the phenomenon has remained significantly undertheorised. One consequence is the absence of an agreed-upon or authoritative definition of watchdog science journalism. Fleerackers et al. (2026) offered a wide-ranging definition, arguing that this form of journalism uncovers research integrity problems in scientific publishing and the actors behind them, and reports on “misuses and abuses of science methods, processes, outcomes, and authority by those practicing, funding, and/or using science in the public domain.” Their analysis centred the watchdog function on research integrity, an umbrella term for problematic practices including a lack of adherence to ethical standards and procedures, the manipulation of data, the falsification of evidence, and fabrication of data. This is a useful definition, especially in its emphasis on research integrity, yet the concept can be strengthened by grounding it in established definitions of watchdog journalism.

The watchdog function, argued Norris (2016, p. 538), was “most pervasive in Anglo-American democracies, where a long liberal tradition has encouraged scepticism towards the potential abuse of state power.” Within this context, the watchdog role is central to the social role of journalism, its philosophical origins lying in

classical liberal theories of democracy in which news media are institutions separate from the state and the market, with a specific role to scrutinise the government and the powerful on the public's behalf (Norris, 2016). Journalists in the watchdog role have an adversarial orientation towards elite authority. Their role is to hold the powerful to account, to ensure institutions function properly, and to ensure officials act in accordance with the standards of the institutions they control (Norris, 2016).

Given the deep intellectual roots of the watchdog idea in Anglo-American democracies, scholarship from that context sharpens the concept's definition. Writing in a collection examining the press as a core institution in American democracy, Bennett and Serrin (2005, p. 169) provided a detailed definition of the role and its functions. The watchdog role, they argued, "may involve simply documenting the activities of government, business, and other public institutions in ways that expose little-publicized or hidden activities to public scrutiny." They defined watchdog journalism as:

(1) independent scrutiny by the press of the activities of government, business, and other public institutions, with an aim toward (2) documenting, questioning, and investigating those activities, in order to (3) provide publics and officials with timely information on issues of public concern. (Bennett & Serrin, 2005, p. 169)

The concept of journalistic independence is open to different interpretations, but in this article, I apply the definition from the Society of Environmental Journalists, adapted to science, which described it as "independence from vested interests" (Palen, 1999, p. 159). This study's definition of watchdog science journalism, then, is: independent scrutiny by journalistic outlets of the activities of science with an aim toward documenting, questioning, and investigating those activities, in order to provide publics and officials with timely information on science-related issues of public concern.

When scholars have discussed watchdog journalism, they have connected it with the related idea of accountability. Waisbord (2000), for example, argued that a crucial function of watchdog journalism was to foster accountability. He argued that accountability meant governments and powerholders should be open and transparent in their workings, explaining their actions and decisions to various publics, a process that ultimately strengthens public trust in democratic institutions.

Yet accountability also suffers from a lack of definitional precision. The emerging field of accountability studies has helped address this weakness. Scholars in the field agreed accountability had its origins in the discipline of accounting. The concept was "anchored in the mundane yet important practice of record-keeping" (Bovens et al., 2016, p. 3). A reliable record provides the evidence on which powerful institutions or individuals can be asked to explain their actions, enforce their standards, and meet their professional duties. Accountability is concerned, therefore, with providing answers to the public or parts of the public that have a "legitimate stake" in demanding an account (Bovens et al., 2016, p. 3). As applied to science for this article, accountability is defined as a process based on record-keeping in which powerholders in science provide an open and transparent public account of their past actions, decisions, and workings to publics with a legitimate stake in a scientific issue.

Ideas of accountability in science have gained prominence across the first decades of the twenty-first century, as signs of systemic dysfunction multiplied, leading to the view that there is a "crisis" in science

(Saltelli & Funtowicz, 2017, p. 5). There have been concerns about the reproducibility of scientific studies, the rise of predatory journals charging academics to publish but offering no editorial oversight, the rise of “paper mills” selling work and authorship to scientists, the mainstream reporting of prominent scientists who have committed egregious fraud, and the massive rise in articles retracted from scientific journals, with more than 10,000 articles retracted in 2023 alone (Fang & Casadevall, 2024; Plümper & Neumayer, 2026; Van Noorden, 2023). The rising rate of retractions, in particular, has been interpreted as a significant indication of problems in science, as retractions represent “unequivocal evidence of project failure” in science (Fang & Casadevall, 2024, p. 294). Retracted papers account for a small fraction of the scientific literature, but their effects are corrosive. They misrepresent the current state of scientific knowledge, divert scientists into unproductive research, provide an unreliable foundation for medical treatments, and erode public confidence in science (Fang & Casadevall, 2024).

Retractions, however, have received little sustained journalistic coverage, and those reported on have tended to concern high-profile instances (Rada, 2007). When journalists reported on an original paper, they tended not to report on its retraction (Rada, 2005). When journals issued a retraction notice, journalists rarely updated their stories on the original paper (Valinciute & Halfman, 2025). Fleerackers et al. (2026) explained why reporters did not cover retractions and research integrity issues more often. Their interview-based study of science reporters in Canada and the UK concluded that the extensive time and labour involved was a barrier to time-pressed and resource-poor journalists. They concluded perceptively that watchdog science journalism was “a feasibility-bound role” (Fleerackers et al., 2026, p. 18), contingent on having the time and resources to undertake it, a conclusion that points to the need to understand the organisational environments that enable science journalists to do such work.

These constraints exist at a time when the specialism is being remade in the twenty-first century (Guenther, 2019; Schäfer, 2017). Widespread digitisation has disrupted the traditional business model of science journalism, and the rise of digital communication has created a new ecology of communication between science and the public in a pluralistic and participatory media environment (Weingart & Guenther, 2016). In this ecology, important audiences for science news are highly-motivated readers with strong professional or political affinities for a field or issue. They constitute a science-focused issue public, who expect high-quality content and often participate in producing and distributing it (Fahy & Nisbet, 2011). To meet this demand, and to report on complex scientific issues, there is a need for “knowledge-based journalism” (Nisbet & Fahy, 2015, p. 223) in which journalists with reporting skills and advanced expertise in a particular area produce high-quality journalistic content. Moreover, these technological and financial changes have created the conditions for emergent structural forms of science journalism that require scholarly analysis (Schäfer, 2017).

The journalism scholar Stephen Reese described and defined one emergent structural form of journalism—what he called the “journalistic hybrid institution” (Reese, 2021, p. 17). He argued that the financial and digital disruptions of the news industry led to what he characterised as a “de-institutionalisation of journalism” (p. 1), a process marked by a decline, in the US especially, in the numbers of staff journalists in newsrooms (summarised in Guenther, 2019). For Reese (2021, p. 4), such de-institutionalisation led to an erosion of the “so-called ‘iron core,’ accountability function of journalism.” An article in *Nature* contained the prediction that the drop in the number of science reporters, coupled with the rapid expansion in information disseminated by scientific institutions, would herald the end of critical science journalism, including watchdog coverage (Brumfiel, 2009).

Reese argued that one reaction to these trends was the emergence of a new type of institutional configuration that combined the newsroom-centred structures of traditional journalism with the professional practices and social missions of civil society organisations, a combination often facilitated by new technologies. Reese (2021) argued that these institutions were defined by the activities they undertook and the shared values and norms that gave those activities coherence. Professionals in the organisation shared “collective frames of meaning” (Reese, 2021, p. 112) about their work and the institution’s mission, as well as shared normative values that underpinned and guided the institution’s various activities. Reese argued that such normative values, which have tended to remain implicit in the analysis of traditional media, should be emphasised in the analysis of emerging institutions. The social value of these new institutions, he argued, was tied to the norms guiding their work, and these shared norms gave the organisation a coherence and a “clear sense of journalistic mission” (Reese, 2021, p. 160).

Two experienced science and health journalists, Ivan Oransky and Adam Marcus, founded Retraction Watch in 2010 in this socio-cultural context. At the time, Oransky was executive editor at Reuters Health, having held senior editorial positions at *The Scientist* and *Scientific American*. Marcus was then managing editor of the specialist publication *Anesthesiology News*. Oransky, in 2010, started the blog Embargo Watch. It scrutinised the contentious embargo system through which journals provided journalists with research papers and media releases ahead of formal publication, a system that gave reporters time to prepare their stories, but also gave journals a high degree of control over the topics and timings of science news (Kiernan, 2006). As Retraction Watch developed, it began work on what would become its database of retractions, a comprehensive database of retracted articles that would be made available to scientists worldwide.

The site’s development followed a series of formal milestones. The Center for Scientific Integrity (CSI) was formed in 2014 as the non-profit parent organisation of Retraction Watch. It received a series of grants from 2014 to support its work from philanthropic foundations, including the MacArthur Foundation, the Laura and John Arnold Foundation, and the Helmsley Charitable Trust. Its active grants in 2026 were from the WoodNext Foundation and Coefficient Giving, formerly Open Philanthropy. The site has also been funded by reader donations and, for a time, the licensing of the database to commercial and non-profit organisations (Oransky, 2023). The CSI is also paid for work its reporters publish in other outlets that have partnership agreements with the organisation. In 2018, it launched its database of retractions. In 2023, the Retraction Watch Database was acquired by Crossref, a non-profit organisation that indexes published scholarly data, an acquisition that provided a sustainable foundation for its work. Crossref pays an annual service fee to the CSI for the maintenance and operation of the Retraction Watch Database. Retraction Watch, then, is an established digital-native outlet with a distinct organisational and financial configuration, making it an example of what science communication scholar Mike Schäfer called the emerging “different shapes of science journalism” that warranted scholarly investigation (Schäfer, 2017, p. 56).

3. Method

My analysis has taken the form of an exploratory case study. Yin (1984, p. 23) defined the case study as “an empirical enquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used.” The exploratory case study is a sub-category that Yin argued could be applied to specific cases to generate wider theoretical insights about a novel or underexplored phenomenon. I purposefully

selected the site because a detailed analysis promised greater conceptual understanding of the undertheorised phenomenon of watchdog science journalism. I selected the site as both a critical and an extreme case, a highly unusual example given its almost exclusive focus on retractions and research integrity (Creswell & Poth, 2018).

My exploratory case study aimed to identify and clarify the central characteristics and core processes of watchdog science journalism as illustrated in Retraction Watch's work. The principal source of evidence was semi-structured elite interviews. I chose interviews because they provide insights unavailable elsewhere and are productive for generating theory (Bogner & Menz, 2009). I conducted a total of ten interviews with seven interviewees. There were two categories of interviews. The first category featured interviews with core, senior staff at the site. Interviewing them provided direct access to their insider explanations and experiences, unavailable through another method, allowing me to gain direct access to their distinct frames of reference for understanding their work (Dexter, 1970). I conducted two sets of interviews at different points, in 2022 and 2026, capturing their considered reflections on recent institutional changes at the site.

The second category consisted of scholars who have studied retractions. I purposefully selected them as representatives of an "interpretive community" (Fish, 1976, p. 483) around retractions and research integrity. Undertaking common professional activities, interpretive communities share broad frameworks for understanding the meaning of texts and their contexts, agreeing on shared meanings and narratives about them (Berkowitz, 2019; Lindlof, 2002). I selected these researchers because they have published scholarly papers on retractions and research integrity, are familiar with the work of Retraction Watch, and represent a reasonable spread of academic disciplines. A full list of interviews can be found in Table 1.

Table 1. Interviewee names, positions, affiliations, and interview date or dates.

Interviewee	Position	Affiliation	Interview date(s)
Dr. Ivan Oransky	Executive director (CSI) and co-founder (Retraction Watch)	CSI	July 27, 2022 and February 25, 2026
Mr. Adam Marcus	Editorial director (CSI) and co-founder (Retraction Watch)	CSI	October 28, 2022 and February 27, 2026
Dr. Alison Abritis	Research director (Retraction Watch)	Retraction Watch	October 25, 2022 and March 10, 2026
Prof. Alison Avenell	Clinical chair in health services research	University of Aberdeen, UK	October 5, 2022
Dr. Elisabeth Bik	Microbiologist and independent scientific integrity consultant	Independent consultant	December 9, 2022
Prof. Ferric Fang	Professor of laboratory medicine and pathology and microbiology	University of Washington, US	October 4, 2022
Prof. Jodi Schneider	Associate professor of information	University of Wisconsin-Madison, US	August 12, 2022

My research received ethical approval from the Research Ethics Committee at the Faculty of Humanities and Social Sciences at Dublin City University. Interviews were conducted via Zoom. All interviewees agreed, through the informed consent process, to have specific quotations attributed to them directly, and all were

given the opportunity to review and clarify their quotations before submission. Given the increased centrality of Retraction Watch's reporting and its database to this community of scholars, it is unsurprising that the interviewees have had various links with Retraction Watch. Fang is on the CSI's Board of Directors; Bik has a formal connection with the CSI through the Elisabeth Bik Science Integrity Fund, which provides financial support to science-integrity advocates. Schneider has professional associations with Oransky. He was an advisory board member on a grant project, led by Schneider and funded in 2020, that examined how to reduce the inadvertent spread of retracted research, and they have served together on National Information Standards Organization (NISO) committees related to retraction. Avenell said she donated money to Retraction Watch.

I analysed the interview data through a reflexive thematic analysis in the tradition of Braun and Clarke (2006, 2022), an approach that does not prescribe a codebook, but argues that a researcher's prior specialist knowledge, conceptual frameworks, and epistemological perspective are constitutive features of the analytic process. I have taken in this study an interpretivist epistemological position, shaped by my interdisciplinary standpoint within the fields of science communication, journalism studies, and the sub-field of science journalism. My process of theme development was primarily deductive, but also contained a significant element of induction. I began with a deductive, theory-driven approach in which the interview data was organised around a set of conceptual categories—watchdog journalism, accountability, independent scrutiny, documenting and investigating matters of public concern, and the provision of timely information to publics—that were based on this study's definitions of watchdog science journalism and accountability. These categories functioned as the primary organising ideas through which I interpreted the interview evidence.

From this starting point, I undertook a reflexive, iterative process, rereading the interview transcripts to construct analytic themes by interpreting how participants' accounts related to, illustrated, and refined the initial conceptual categories. This process resulted in the creation of the first four out of the final five themes. As part of my ongoing reflexivity throughout my analysis, I constructed the last theme—about the site's classification as a journalistic hybrid institution—in an inductive process. This theme emerged from patterns in participants' accounts of how they understood and described the organisation and its functions. I supplemented the interview data with two other forms of evidence: line charts presenting longitudinal patterns in the site's journalism and database, and facts and examples from the site demonstrating aspects of its work. These corroborate and enrich the interview evidence in interview-based case studies (Creswell & Poth, 2018; Diefenbach, 2009).

4. Research Questions

Drawing on participants' accounts, what are the characteristic features and core processes of Retraction Watch's watchdog journalism? How do participants understand the site's role, through its journalism and its database, in fostering accountability in science?

5. Analysis: Characteristic Features and Core Processes of Retraction Watch

5.1. Journalism Anchored in an Ethos of Accountability

The site's defining characteristic has been its ethos of accountability journalism. For Oransky (personal communication, July 27, 2022), the site's approach to journalism was consciously shaped by a determination to avoid the uncritical science promotion that has sometimes characterised science journalism:

One of the things that I'd always cared about, and this was before Retraction Watch, before Embargo Watch, which to me was also a kind of accountability journalism, was, you know, not treating hospitals, researchers, research institutions, journals, universities, not treating them like they were flawless and like we were all just there to promote science.

The site's accountability journalism focused on retractions to examine and test the canonical claim that science was self-correcting. The sociologist of science Robert K. Merton argued that the authority of science rested on institutional checks and balances ensuring that errors, fraud, and biases were corrected in subsequent research, making its evidence base more reliable over time (Merton, 1973). Oransky (personal communication, July 27, 2022) argued it was vital to scrutinise this claim because it underpinned the epistemological basis of science and arguments for its social value:

When we started, I had a sort of working hypothesis that self-correction was not nearly as robust and effective and useful as we all were led to believe....The reason why it's important is because, in order to be able to trust the evidence base, in order to be able to trust that what someone is saying is actually based on evidence...you need to know that the system is set up so that, you know, it is getting closer to the truth, that it is not allowing....out-and-out fraud or just bad mistakes to prevail....How are you going to move forward? How are you going to develop any kind of health benefit, technology intervention without knowing that the system, maybe not immediately, but over some reasonable period of time, will correct?

The site's accountability journalism examined the self-correction undertaken by scientific journals, the vital custodians of the scientific record. Journals merit scrutiny also because of their concentrated economic power. Larivière et al. (2015) argued that journal publishing has operated as an oligopoly of international conglomerates, with the top five publishers in 2013 accounting for more than 50 percent of all published papers. Marcus (personal communication, October 28, 2022) argued that these publishers were not fulfilling their accountability functions by withholding from readers the reason why an article was retracted:

I think we felt like "big publishing," scholarly publishing, was getting away with too much. What they were getting away with was not cheating; they were getting away with being opaque and not serving their readers, and not serving the public, all while making billions of dollars a year. And so, we wanted to hold them to account.

Researchers of scientific integrity agreed that profitable publishers needed scrutiny of their correction practices, since a lack of accountability—a lack of providing answers to researchers—had implications for the reliability and accuracy of the scientific record. As a representative expression of this viewpoint, Avenell (personal communication, October 5, 2022) said:

The publishers really haven't got to grips with the whole issue of correcting research, either for honest errors or for the continuum all the way up to research that is completely fabricated. Their business model, these immensely profitable businesses—you wonder where their key thrust is in terms of what is their purpose. Is actually conveying correct research and advancing science really their main purpose? Or is it just in making money and protecting against litigation?...Somebody has to try to hold these huge organisations to account.

5.2. Documenting Retractions and Questioning and Investigating the Reasons for Retractions

While the site's accountability journalism focused on journals to test the claim that science is self-correcting, its reporters built their stories from individual retraction notices. In this regard, its reporting is aligned with science journalism historically, which has frequently drawn on journal articles as primary sources (Guenther, 2019). A traditional constraint on science coverage in mainstream outlets has been that science and health stories had to compete with stories from other domains for the attention of editors acting as gatekeepers who decided which were published and given prominence (Guenther, 2019). Journalists at the site were able to avoid this competition and focus on retractions.

Even though retractions are formal publications, they have received little journalistic attention. While there have been occasional reports of retractions before the site was founded, Marcus (personal communication, October 28, 2022) noted that "no one was doing it systematically." One foundational process anchors the site's watchdog journalism: The routine documentation of retractions. Suggestive evidence of this routine documentation can be seen in Figure 1, which charts the annual number of posts on Retraction Watch from its foundation to 2025. I calculated these totals in March 2026 by summing the monthly post totals listed on the site's archive pages.

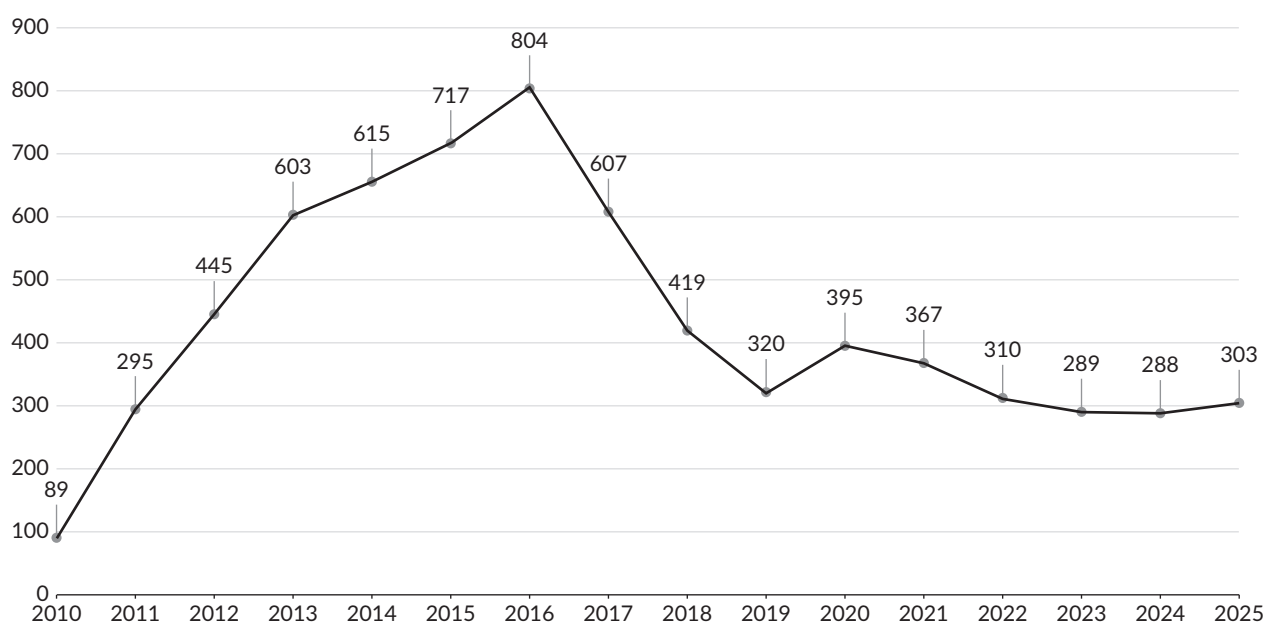


Figure 1. The annual number of posts on retractionwatch.com from 2010 to 2025, as calculated by the researcher from the monthly post totals listed on the site's archive pages.

But documenting retractions was rarely straightforward. Journalists and researchers agreed that notices did not always disclose why a paper had been retracted. A notice would state that a paper had been retracted, but often the reason was not evident. One study summarised these problems by observing that retractions were “often slow, opaque and inconsistent” (Grey et al., 2020, p. 2085). To address this, reporters went beyond the notice to investigate why a paper had been retracted, using the established journalistic method of interviewing. They sought the reason by questioning journal editors, paper authors, publisher representatives, and other scientists. Oransky (personal communication, July 27, 2022) noted that such questioning revealed a far more complex picture of the retraction than was stated in the notice:

When we did dig into them, we realised that the retraction notices, which were the sort of public face of all of this, were woefully inadequate if they existed at all, and that felt like a transparency problem....We had this untapped mine, wonderful mine, of great stories that actually had a transparency, accountability sort of narrative built in.

Researchers agreed that a crucial element of the site’s work was its skilled journalistic questioning and investigation around retraction notices. Fang (personal communication, October 4, 2022) said the journalists’ methods were able to unearth details of the retraction not previously publicised by a journal:

A lot of times we don’t get those details, and it can be very illuminating to figure out how this happened, not only why people did what they did, but how it escaped notice.

Bik (personal communication, December 9, 2022) said:

Retraction Watch has done an amazing job in asking further, asking more questions like, why? You know, if it [the journal] says...“yeah, it’s a republication”—what do you mean by that? Can you give some more details? And they have done an amazing job in getting publishers to be a little bit more open on why a paper got retracted, and those things are important because, especially if you have based part of your research on a paper that now got retracted, you want to know which parts of the paper you could still trust.

As other elements of its documentation, the site has recorded trends related to retractions, including a “leaderboard” of researchers with the most retracted articles, retractions by Nobel Prize winners, retracted Covid-19 papers, and the ten most highly-cited retracted papers (www.retractionwatch.com).

5.3. The Retraction Watch Database Has Documented Retractions and Questioned the Reasons for Retractions

The creation of the database began in the mid-2010s, indicating that, from close to its foundation, the site planned to expand beyond journalism into a larger institutional form. The database was related to accountability and aimed to enhance self-correction in science. As the site’s research director, Alison Abrisit (personal communication, October 25, 2022), said, a role of the database was:

To improve the quality of literature that is coming out. So, I like to think that we have a good role in not only cleaning up literature but making literature that is being published come to a higher perspective, or a higher standard.

The site's journalism aimed in part to bring retractions to greater public scrutiny. But its founders recognised a deeper and more systemic problem: The record of retractions in the scientific literature was inconsistent and unreliable. Although they are formal scientific publications, retraction notices have proved difficult to gather, collate, and index, even within scholarly databases such as PubMed, Web of Science, and Scopus. Just as the site's reporting aimed to systematically cover retractions, its database aimed to systematically organise them.

This work went beyond simple identification and collation. Populating the database featured core processes similar to the site's journalism: Documenting retractions and investigating why articles were retracted. These processes have been essential to the systematic categorisation of retractions. Abritis (personal communication, March 10, 2026) said identifying the reasons for retractions and capturing them in the database was "a highly dynamic process," an investigative activity that required familiarity with the language of scientific publishing, which can often appear unclear, evasive, and opaque. Abritis (personal communication, October 25, 2022) said:

We look for retractions. We look for the term withdrawal. We look for the term removal, and so that's what we're doing, and what we're finding out is it's a lot more work than we ever thought of.

The reasons for retraction, as the site categorises them, include duplication of data, error in data, falsification or fabrication of data, falsification or fabrication of results, false or forged authorship, manipulation of data, manipulation of images, misconduct by author, plagiarism of data, plagiarism of image, plagiarism of text, computer-aided content or computer-generated content (for the full list, see Retraction Watch, 2025). Abritis (personal communication, October 25, 2022) said that when retracted articles were found, some were difficult to categorise because the reason for retraction was not stated:

There's no consistency, even within a journal [about] how a retraction notice is published. So here you're trying to build a database which is a standardisation of a process that has no standardisation.

The database developed into a novel piece of scientific infrastructure. But deciding that a database of retractions was needed and creating it, like the creation of other databases, was not a neutral process. It resulted from sustained organisational and interpretive knowledge work that enabled research by providing shared, standardised information for scholars. The database also shaped what research became possible, supplying new categorised data and opening new research questions. Moreover, the database was made available to scholars, opening access to knowledge to a greater number of researchers (on the knowledge work of database construction, see Bowker & Star, 1999; Star & Ruhleder, 1996). The core watchdog process of careful, consistent documentation over time is evident in the information captured in the Retraction Watch Database, formally launched in 2018. Figure 2 below maps the total number of retractions in the database between 2015 and 2025.

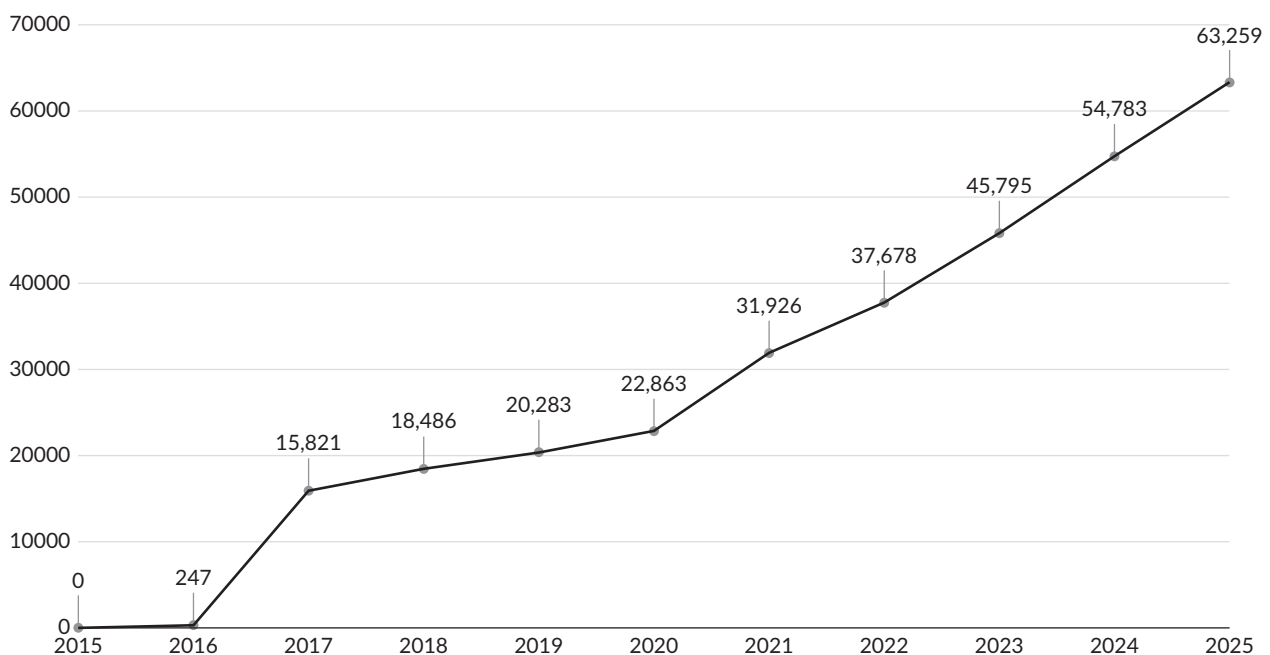


Figure 2. The total number of retractions in the Retraction Watch Database between 2015 and 2025. Source: Retraction Watch and the CSI.

By mid-2026, the site listed more than 500 papers citing the work of Retraction Watch (Retraction Watch, 2026). Jodi Schneider (personal communication, August 12, 2022) expressed a view shared among interviewed researchers about the site's scholarly value:

For people who are trying to do research about retractions, the Retraction Watch Database itself has become a really valuable resource. It's very common for researchers to get access to the database itself, and you can see a lot of recent publications that are mentioning that as the data source.

5.4. Providing Publics and Officials With Timely Information on Science-Related Issues of Public Concern

Compared to science journalism generally, aimed at mostly non-specialist audiences (Guenther, 2019), Retraction Watch's journalism has largely focused on a specialist public. According to its founders, a significant proportion of its audience has consisted of readers professionally interested in research integrity: scientists, journalists, professionals in scientific publishing, and officials involved in research integrity. This public can, therefore, be considered an elite science-focused issue public for research integrity.

As Marcus detailed (personal communication, October 28, 2022), journals at first disliked the scrutiny from the site, but had to pay increasing attention because of the influence of its audience of "mostly scientists, some policymakers, some journalists...exactly the sort of people who journal editors care about." A study that examined the site's X page found further evidence about its public. It found that users who commented on a sample of the site's posts were mainly from scientific and academic backgrounds, with almost 41 percent of those commentators identifying themselves as "scientists, scholars, or academic institutions" (Mede et al., 2025, p. 13). Though niche, the public has been sizeable: At the end of 2011, the site noted that it would

surpass 1.5 million pageviews, and in 2024, it reported a record year for traffic with 7.5 million pageviews (Oransky, 2011, 2024).

As well as a source of information, the site became an outlet around which the issue public of researchers interested in scientific integrity could gather, as Avenell (personal communication, October 5, 2022) described:

It is most useful to read about other people's experiences so that you can, if you like, vicariously share the frustrations that one has. Because I think if you spoke to anybody who works in the areas that we do where we are investigating studies and negotiating with journals about trying to correct the literature, it is immensely frustrating and a thankless task, and nobody thanks you. And so, to some extent, for people like me, I think the good thing about Retraction Watch is that it shows you you're not alone. These are the experiences of other people. There's a community of you working together.

Schneider (personal communication, August 12, 2022) described how the different elements of the site—its journalism and its database—cohere to provide a complementary set of facts and interpretations for its audience:

Reading retraction notices and categorising often very limited information that's in those, sometimes for legal reasons, that's valuable....Then going and digging and kind of reading between the lines and sort of putting the pieces together and getting further information and writing stories about it—that's also valuable....Each of those things is really value-added....For me, I love at least the collated information, the sort of first layer of what's retracted...that ought to be well-curated information but...unfortunately it's not so well curated...and Retraction Watch is a really, really good source of that information.

5.5. Retraction Watch Functions as a Journalistic Hybrid Institution Underpinned by a Normative Value of Accountability

Over time, the site developed into a journalistic hybrid institution, combining science journalism with the scientific infrastructure of its database. With the sustainable financial base provided by Crossref's acquisition of the database, the site has continued to expand. I conducted the second set of interviews for this study in 2026, one aim of which was to gather reflections from senior staff about how the site had changed since the acquisition. The interviews were conducted a year after a range of new initiatives began under the auspices of the CSI. The Medical Evidence Project draws on metascientific methods to examine the medical literature. The Sleuths in Residence programme supports researchers on projects that examine the scientific literature. The Elisabeth Bik Science Integrity Fund provides financial support for the work of science-integrity advocates.

These expanded activities cohere because each is underpinned by the normative value of accountability. Asked how they would categorise the CSI's work, spanning research, investigation, and journalism, both Retraction Watch founders emphasised accountability as a central unifying value. For Oransky (personal communication, February 25, 2026):

It certainly still has a journalistic core, and the journalism we do is central to our mission. I always cringe at the word advocacy, because I think it's important to not be an advocate when you're a journalist. However, I think there are things you can advocate for, like transparency, like quality, like oversight and

accountability. They're journalistic principles....If I were to try and describe it, it would be a non-profit organisation that is trying to improve the state of science by examining its processes and outputs in different ways.

And for Marcus (personal communication, February 27, 2026):

The fundamental goal is the same as Retraction Watch, which is to illuminate problems in research, research publishing, the practice of science, and bring those to the attention of the public, and to the research community, and try to help foster a culture of more accountability.

6. Conclusion

My exploratory case study of Retraction Watch has several limitations. My selection of the site as an extreme and critical case means the identified characteristics and processes of the site cannot be generalised to other science journalism outlets. The conclusions that can be drawn from the case are also restricted because the site had a unique process of development in the American media context and was shaped by the distinct professional histories, expertise, and motivations of its founders. A further limitation is that the study's base of evidence consists primarily of a small number of interviews and is heavily reliant on accounts from senior staff at the site, who could be expected to present the site favourably. I also acknowledge that additional interviews with more researchers might have introduced different perspectives about the site's work. Nevertheless, the study is not presented as a definitive analysis of the site, but as an exploratory study that aims to create a deeper theoretical understanding of watchdog science journalism.

Within these acknowledged limitations, my central argument is that Retraction Watch has undertaken watchdog functions as it came to operate in a novel institutional configuration, a journalistic hybrid institution, as theorised by Reese (2021), combining science journalism and the scientific infrastructure of the retraction database to hold science to account around its claim to be self-correcting. While journalism and database construction are sociologically distinct activities, they are given coherence within Retraction Watch because they are underpinned and guided by the shared normative value of accountability. That ethos was central to the site's original journalistic mission and carried over into all its subsequent activities. The idea of accountability, the need to scrutinise science to enable self-correction, and the agreed focus on the responsibility of journals as custodians of the scientific record have been core frames of reference guiding its journalism and research.

Retraction Watch fostered accountability in science through its journalistic and research processes, which have commonalities. In its journalism, it applied to science publishing the established processes of watchdog journalism articulated by Bennett and Serrin (2005). Its reporters *documented* retractions and *questioned* and *investigated* the reasons for them, looking beyond opaque notices to uncover information that they relayed into journalistic narratives of accountability. Through these processes, the site fostered accountability in science, opening the often-hidden processes of retraction to public scrutiny, illuminating the quality-control systems of science, and asking publishers to answer to the wider scientific community about why papers were retracted. Researchers had a legitimate stake in knowing this information, as they sought to build their own research on reliable knowledge. This was specialist journalistic work, and the site's reporters—notably Oransky and Marcus—had the combination of reporting skills and specialist understanding to undertake

knowledge-based journalism in the domain of retractions and research integrity (Nisbet & Fahy, 2015). This commitment to accountability—Reese’s (2021, p. 4) “iron core” of journalism—is central to its reporting. The focus on accountability also sets Retraction Watch apart from other types of hybrid or boundary-spanning organisations that supply scientific information to improve science journalism, such as Science Media Centres (Broer & Pröschel, 2022).

In the construction and continuous development of its database, the site scrutinised retractions through a similar set of processes to its watchdog science journalism. Researchers *documented* retractions and *questioned* and *investigated* the reasons for them to systematically capture an accurate record of these publications for the wider research community. These processes fostered accountability by giving researchers a comprehensive corpus of evidence on which to study retractions, helping produce papers that critiqued and corrected the scientific record. As it is continually updated, the database provides timely information to its public of researchers, helping make science more transparent about its self-correction and the accuracy of the scientific record. As a journalistic hybrid institution, Retraction Watch’s journalism and research work have been built on a foundation of careful record-keeping and documentation (Bovens et al., 2016).

The single case of Retraction Watch cannot be generalised to science journalism overall, but elements of it can be transferred to other cases. My analysis has documented how Retraction Watch undertook watchdog science journalism, demonstrating that these processes, established in watchdog reporting generally, applied to one example of science journalism. Identifying and explaining these processes contributes to emergent scholarship on how watchdog science journalism is defined and understood (Fleerackers et al., 2026). It is plausible to assume that these processes will apply to other cases of watchdog science journalism, especially the core processes of documentation and questioning, and the provision of timely information to a public with a stake in scientific issues. The case also demonstrates that there is a significant public for high-level watchdog science journalism, who seek out specialised reporting on the sociology of science, the governance of science, and the epistemological reliability of research literature. As interviews with researchers demonstrated, the site’s success is connected to meeting the information needs of a narrow, elite issue public. At a time of heightened concern over the reliability of the scientific record (Saltelli & Funtowicz, 2017), its work met a demand for high-quality information on research integrity. But one potential inference from its success is that the production and consumption of such high-level science journalism will remain the preserve of elite publics without being aimed at or circulated through wider society. The site is a rich case for future analysis of the content of its journalism, the reasons for fluctuations in its coverage, the role of philanthropic funding in its work, and the effects of its work on the wider public understanding of science.

Retraction Watch as a journalistic hybrid institution is an illustrative example of potential future organisational forms of science journalism. If the identified trends in Western countries continue (Guenther, 2019), the specialism will face continued financial pressures and digital disruption. Science journalism might need to adopt new hybrid institutional forms, such as fusing a journalistic organisation with an advocacy organisation or a research organisation. Such novel forms could sustain the production of science journalism, while opening new ways to distribute it, alongside related public interest information including datasets, policy briefs, and research findings. These new “shapes of science journalism” (Schäfer, 2017, p. 56) will take different forms, contingent on the histories and motivations of their creators, their socio-cultural context, and their funding sources, but their coherence and social value will rest on shared

normative values related to the public interest ethos that has guided journalism in liberal democracies. As an example of what these forms can look like, Retraction Watch remains an illustrative case, a distinct digital-age organisation that stands as a significant example of the long-anticipated, but little-realised, idea of watchdog science journalism.

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Conflict of Interests

The author declares no conflict of interests.

Data Availability

Data is not available.

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Beyond Amplifiers and Watchdogs: Rethinking Institutional Science Communication–Journalism Relations in Hybrid Media Ecosystems

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Abstract

Contemporary science communication increasingly unfolds within hybrid media ecosystems where scientists, institutional communicators, journalists, and audiences interact under rapidly changing conditions. In these ecosystems, universities and other research organisations have become highly visible communicative actors, supported by growing investments in strategic science communication. At the same time, science journalism faces economic precarity, shrinking newsroom capacity, and growing reliance on institutional sources. These developments have fuelled long-standing debates about hype, churnalism, and the erosion of journalism's watchdog function, often framed as ethical or professional failings. However, these tensions between institutional science communicators and science journalists can also be seen as the structural consequences of contemporary science communication rather than as interpersonal conflicts or normative shortcomings. We conceptualise this relationship through two analytical lenses. A high-tension perspective foregrounds risks to journalistic independence, critical scrutiny, the watchdog role, and public trust under conditions of media asymmetry and the expansion of institutional authority over the public communication of science. A low-tension perspective highlights functional interdependence, role complementarity, and the ways institutional communication can enable science journalism in constrained media environments. Rather than treating these perspectives as competing accounts, we use them to illuminate different normative stakes within the same ecosystem. We thus propose a framework for constructive interdependence that acknowledges blurred boundaries and role overlap while actively protecting the integrity of independent

scrutiny, and argue that safeguarding journalism's watchdog role should be understood as a shared responsibility across communicators, institutions, and intermediaries. While we wrote this piece primarily for science communication scholars, we hope that the proposed framework offers science journalists, institutional science communicators, and research funders four concrete principles for protecting independent scrutiny as science communication ecosystems continue to change.

Keywords

churnalism; institutional science communication; journalism; science communication; science journalism; science PR; professional roles

1. Introduction: Competing Logics at the Science-Media Interface in Hybrid Media Ecosystems

Historically, journalism acted as the primary mediator between science and the public (Dunwoody, 2008, 2014; Guenther, 2019; Nelkin, 1995). Today, research organisations have become major players that proactively produce press releases and online or social media content and enter into partnerships with the media, resulting in a shift from a journalism-centred model to a multi-actor system in which organisations play a central role (Peters, 2022). In contemporary science communication ecosystems, relationships and interactions are no longer structured around stable, linear roles. Instead, they are shaped by rapidly evolving digital information environments in which scientists, institutional communicators, journalists, influencers, and audiences, among others, interact in increasingly complex ways (Krause et al., 2025; Mede et al., 2025; Schäfer, 2017). New players such as algorithmically driven platforms increasingly disrupt traditional journalistic gatekeeping and blur the boundaries between journalism, institutional communication, and other communicative actors, intensifying tensions between attention-oriented, strategic science communication, and the critical, mediating role historically associated with science journalism (Franks et al., 2023; Guenther, 2019; Metag et al., 2023). Authority over how science is represented and interpreted is therefore no longer concentrated among a small set of professional communicators but is distributed across a competitive ecosystem populated by multiple, more or less powerful non-journalistic actors who communicate strategically and directly with public and policy audiences. While acknowledging the multiplicity of actors that have different, and often overlapping, roles in the public communication of science, in this article, we focus on two main actors and their relationship in modern science communication ecosystems: institutional science communicators and science journalists. However, these two groups do not act in isolation. Scientists are central to both, serving as sources and spokespersons for institutional communication and as the subjects and sources of journalistic scrutiny, while increasingly communicating directly with public audiences in ways that bypass both (e.g., on social media; Guenther et al., 2023). Other actors, including social-media influencers, algorithmically driven platforms, and increasingly active audiences, further shape the visibility and content of scientific information within which communicators and journalists operate. We return to these actors later, to show how boundaries blur and how scientists, social-media influencers, platforms, and audiences move across the roles we distinguish here.

In modern communication environments, universities and other research organisations or even companies have become increasingly visible and influential in the public communication of science. Corporate science communication, or science public relations (PR), is now widely recognised as a strategic organisational

function shaped by institutional logics, reputation-building, and performance metrics tied to attention, visibility, impact, and funding competitiveness (Schäfer & Fährnich, 2020; Weingart, 2012). Across many countries, staff capacity and infrastructure for institutional science communication have expanded markedly (Entradas et al., 2023, 2024). Research outputs are packaged and promoted through professionalised infrastructures, ranging from embargoed press releases to coordinated social-media campaigns, processes described by Marcinkowski and Kohring (2014, p. 1) as “institutionalised push communication.” Decisions about which research becomes visible, how it is depicted, and when it is communicated are thus embedded in branding strategies, managerial expectations, and competitive research environments.

Science journalists operate within the same ecosystems but under a fundamentally different mandate. Like institutional communicators, journalists create attention for scientific issues, aiming to make scientific knowledge accessible, intelligible, and socially relevant (Dunwoody, 2008, 2014). By doing so, science journalists follow their own logic and professional criteria (such as news factors) that in many ways depart from established criteria within science (e.g., Guenther, 2019), which can become a source of tension between the two groups. However, in a democratic society, journalism carries a distinct responsibility: to scrutinise scientific claims, interrogate uncertainty, expose misconduct and fraud, and hold powerful actors (including individual scientists, as well as universities and other research organisations/companies) to account. This includes independent and critical work in line with journalism’s watchdog function: fact-checking, challenging exaggerated claims in journal papers and press releases, and exposing scientific misconduct. Conventionally positioned as independent watchdogs, journalists in democracies are normatively accountable to public audiences rather than to the organisations they report on. The democratic function of journalism most directly at stake is accountability, that is, the capacity to hold scientific and institutional power to account, together with the closely related epistemic function of safeguarding the reliability of the knowledge that enters public debate. Nevertheless, when asked, most science journalists would say that they see themselves as neutral providers of information rather than as critical watchdogs (e.g., Dunwoody, 2014; Guenther, 2019).

Based on these insights, it is not surprising that relationships between institutional science communicators and science journalists are often described as uneasy or conflict-laden, with ongoing debates about science PR, hype, churnalism, and the erosion of journalism’s critical distance from scientific authority reflecting these tensions (Guenther & Joubert, 2021; Joubert, 2019). Much of this debate, however, has tended to label tensions between communicators and journalists as matters of ethics, professional misconduct, or failure, rather than seeing them as features of contemporary science communication ecosystems (e.g., Bucchi & Schäfer, 2025). In contrast, this conceptual article argues that such tensions are better understood as structural conditions within contemporary and hybrid science communication ecosystems. We propose that these tensions arise from unequal power relations, divergent accountability structures, and the reconfiguration of media infrastructures in which both professions are embedded. Rather than asking whether science communicators or journalists are behaving properly or improperly, we will shift the analytical attention to how their roles are shaped, constrained, and, at times, forced into uneasy interdependence by broader economic and institutional dynamics.

At the surface level, institutional science communicators and science journalists share several points of alignment. Both translate complex scientific information and knowledge for public or policy audiences; both value accuracy, clarity, and timeliness; and both operate under intense time pressures in competitive

attention economies. In practice, journalists often rely on institutional communicators for access to scientists, embargoed press releases, expert contacts, and contextual materials. Institutional communicators, in turn, rely on journalists to extend the reach and perceived legitimacy of scientific information beyond institutional channels into trusted media spaces. This functional interdependence is not an equal one (as was theoretically proposed, for instance, in the intereffication model; Bentele & Nothhaft, 2008; see also Comfort et al., 2024) but coexists with fundamental divergences in professional orientation. Institutional communicators are structurally accountable to their employers and management, in some cases to funders; their performance is often evaluated through metrics tied to attention, visibility, reach, and reputational impact. Journalists, by contrast, as watchdogs, are normatively accountable to publics and democratic ideals, including the scrutiny of power, the exposure of wrongdoing, and the interrogation of uncertainty and conflict.

Understanding this relationship in hybrid media ecosystems, therefore, requires moving beyond binary distinctions between “good” and “bad” actors—i.e., actors who either fulfil their (normative) roles or not. Instead, it calls for an interrogation and understanding of how professional roles are enacted under unequal structural conditions. To that end, we distinguish between high-tension and low-tension dynamics as analytical lenses rather than mutually exclusive states. A high-tension perspective foregrounds risks to journalistic independence, the watchdog function, and public trust in science amid media precarity and the expansion of institutional communication authority. A low-tension perspective, by contrast, highlights functional interdependence, complementary roles, and how institutional communication can enable science journalism in constrained media environments. Rather than treating these perspectives as competing realities, we use them to illuminate different normative stakes within the same hybrid science communication ecosystem. By bringing these perspectives into dialogue, we aim to move beyond binary oppositions between good and bad or between “amplifiers” and “watchdogs,” and to develop a framework for constructive interdependence that acknowledges role overlaps and blurred professional boundaries while actively protecting the integrity of independent scrutiny. In doing so, we argue that safeguarding journalism’s watchdog function should not be solely a journalistic concern but a shared responsibility among institutions, intermediaries, and funders.

In this conceptual article, we navigate between high- and low-tension perspectives and disregard a no-tension perspective as, based on the literature, tension is inherent in the relationships between these actors, with conflicting professional norms and dissimilar cultural values stated as reasons for this (e.g., Guenther & Joubert, 2021). Furthermore, although it may seem that the high- and low-tension perspectives are mutually exclusive, they can actually be seen as two extremes on the same continuum. Naturally, there is a spectrum of views between the two. We decided to focus on the extremes to show that there are two readings of the same tension. The low-tension reading foregrounds the conditions under which these tensions operate productively, as functional interdependence and role complementarity; the high-tension reading foregrounds the conditions under which the same tensions become antagonistic, placing journalistic independence and accountability at risk. The relevant boundary condition is thus qualitative rather than metric.

Although this article is a conceptual contribution written primarily for science communication scholars, we intend the framework to be equally useful in practice: it offers science journalists and institutional communicators, as well as research funders, a shared language for treating these tensions as structural rather than personal, and a basis for shaping training, editorial policies, institutional guidelines, and funding arrangements that protect independent scrutiny, or the so-called “watchdog function” of science journalism.

2. High-Tension Dynamics: Media Precarity, Churnalism, Hype, and the Erosion of the Watchdog Function

The high-tension perspective emphasises how structural transformations in contemporary media systems have intensified friction between institutional science communication and journalism, with significant implications for journalism's watchdog role and for public trust in both journalism and science (Weingart & Guenther, 2016). Metag (2021) highlights how visibility has become a central yet contested goal in contemporary science communication, revealing tensions between promotional, attention-oriented communication logics and more reflective practices such as critical journalism and public dialogue. At the same time, shrinking specialist beats, newsroom cutbacks, and growing reliance on freelance work have made most science journalism increasingly dependent on institutional sources for information and economic survival, thereby amplifying institutional voices and weakening traditional watchdog journalistic functions (Franks et al., 2023). Of course, many science journalists remain gatekeepers (e.g., Rosen et al., 2016) and not all media companies have been hit the same way. Nevertheless, science journalism is under pressure and one of the many outcomes of this can mean single-source journalism: Science journalists do not have the time to seek additional independent sources to confirm or contradict information (Guenther, 2019)—and at this stage, the independent watchdog role is already threatened.

But this can spiral even more. Institutional communicators have begun producing media-ready science content at scale, enabling rapid, low-cost science coverage in which news outlets can republish press releases with little or no independent verification—a practice commonly described as “churnalism” (Brück et al., 2025; Davies, 2009; Guenther et al., 2024). Empirical studies across national contexts document substantial similarity between press releases and subsequent news coverage, particularly in under-resourced media environments such as science journalism (Comfort et al., 2024; Heyl et al., 2020; Sumner et al., 2014; Vogler & Schäfer, 2020). Churnalism can be seen as an amplification of the threat posed by single-source journalism; independent science coverage and the watchdog role of science journalists are at stake when external material is not only treated as a source but when complete content is used in journalism, even when produced by a disinterested source. This undermines journalism's societal function. However, importantly, as will be elaborated in Section 5, churnalism is better understood as a symptom of structural asymmetry than as a moral failing. As professional science journalism has shrunk, science PR has expanded. In media environments that reward speed, homogeneity, and recognisable formats, for media companies who have been hit hard, reliance on institutional material becomes structurally rational, even as it erodes science journalism's capacity for independent scrutiny.

These asymmetries are further intensified by the expansion of institutional communication into direct-to-public publishing via websites, online platforms, and social media where research organisations gain increasing control over how scientific advances are framed and contextualised, often privileging novelty and positive findings. This creates a situation that departs massively from the time before digitisation, when science journalism was the main and only source of scientific information for public audiences (e.g., Guenther, 2019). These dynamics are further complicated by the growing use of generative artificial intelligence (AI) tools that can produce content such as press releases, news articles, and simulated opinion pieces at unprecedented speed and scale, potentially accelerating content homogenisation and further displacing human editorial judgement and investigative work.

From this high-tension perspective, the erosion of journalism's watchdog function is not merely a professional concern but a democratic one. As Deighton (2026) argues, without sustained investment in independent science journalism and watchdog functions, societies risk losing a critical mechanism for holding scientific institutions, companies, and even governments to account—particularly in moments of controversy, crisis, or heightened uncertainty. Read in this way, hype and churnalism are not isolated pathologies but visible symptoms of deeper structural imbalances that place journalism's critical role under increasing strain.

3. Low-Tension Dynamics: Role Complementarity in a Constrained Media Ecosystem

A low-tension perspective offers an alternative analytical reading of the structural conditions described in Section 2. Rather than viewing institutional science communication as a threat to journalistic integrity, independence, and roles, this perspective understands it as a legitimate and necessary component of contemporary science communication ecosystems operating under conditions of attention scarcity, media precarity, and intensified competition for attention and visibility. This perspective recognises institutional science communication as a professional practice that renders scientific work visible, intelligible, and socially relevant while remaining ethically grounded. As proposed by Vissers et al. (2024), science communication and PR are mutually beneficial activities that are entwined along a continuum. This continuum refers to the overlap in their practices and outputs and not to an equivalence in accountability, since institutional communicators remain answerable to their employing organisations and journalists to their publics. Mutual benefit does not imply symmetry: Under conditions of media asymmetry, the relationship increasingly favours institutions, which is exactly the tension our framework (see Section 5) seeks to manage.

From this viewpoint, there is nothing inherently problematic or unethical about institutions promoting scientific achievements or communicating research advances to society, even if systemic problems such as resource asymmetries between institutional and independent science communication arise at the level of the ecosystem. Institutional science communicators can be understood as additional important mediators between science and society (Peters, 2022; Volk et al., 2023), whose work enables wider dissemination of research in ways that can benefit scientists, journalists, and publics alike (Shipman, 2014, 2015; VanDyke & Lee, 2020; Vissers et al., 2024). Proponents of this perspective may point out that science has always competed for attention and public legitimacy, from early public demonstrations to contemporary social-media posts (DuFault, 2025), and that communication specialists frequently emphasise that most institutional science communicators practise responsible science communication, which prioritises accuracy, audience understanding, and trust rather than mere attention, visibility, or reputational gain (Greer, 2025; Shipman, 2014, 2015).

This perspective also highlights the functional interdependence between institutional communicators and journalists in constrained media environments. During crises or controversies, when newsrooms need fast access to credible scientific information, institutional communicators become critical intermediaries and journalistic allies by facilitating access to experts and contextual information, helping to counter misinformation and pseudoscience (Perreault & Perreault, 2021; Vissers et al., 2024). Ethical science PR can thus support transparency, dialogue, and institutional reflexivity, particularly when oriented towards building public trust rather than maximising publicity (Borchelt & Nielsen, 2014; Irwin & Horst, 2016). Seen through this lens, science PR does not replace journalism but may enable it by lowering transaction costs and

supporting journalistic work under severe time and resource constraints, even though such enabling can, over time, shade into dependency and reshape journalistic practice asymmetrically.

At the same time, this complementary role is conditional rather than guaranteed. It depends on the continued existence of independent editorial judgement and journalistic autonomy, rather than serving as a substitute for them. Although PR and journalism are anchored in different normative traditions, they are interwoven in practice and often draw on overlapping techniques and repertoires (VanDyke & Lee, 2020). For example, marketing and branding strategies can be deployed in science communication to combine scientific accuracy with emotional resonance, thereby making research more relatable and socially salient, increasing citizen engagement and perceived relevance (Kaponi et al., 2023; Newman & Beets, 2023).

Hence, viewed through a low-tension lens, the relationship between institutional communicators and journalists is best understood as complementary rather than adversarial. Institutional science communication redistributes communicative labour within hybrid media ecosystems, supporting the circulation of scientific information and knowledge while reshaping journalistic practice. This perspective does not deny the risks identified by the high-tension lens, but it explains why institutional communication persists as a structurally embedded feature of contemporary science communication ecosystems, produced by structural dynamics such as path dependence and institutional lock-in, rather than as a temporary or pathological deviation. Describing this persistence as structural is an analytical claim about its causes, not a normative judgement that it is necessary or desirable; indeed, several of these conditions are among the risks our framework seeks to manage.

4. Intermediaries, Infrastructures, and Blurred Boundaries in a Hybrid Ecosystem

The dynamics described above do not operate solely through professional roles but are mediated and stabilised by a growing set of intermediary infrastructures that shape the circulation of scientific information and knowledge within hybrid media ecosystems. These include press-release distribution services (e.g., AlphaGalileo, EurekAlert!, or idw—Informationsdienst Wissenschaft), science media centres, and platform-based publishing models (e.g., *The Conversation*) that structure access to expertise, visibility, and legitimacy. Such intermediaries occupy an ambivalent position: They facilitate the flow of scientific information while reinforcing reliance on institutional sources. Hence, they speak to both the high- and low-tension perspectives.

From a neutral or functional viewpoint, these infrastructures can serve as protective buffers in crowded, resource-constrained media environments. By providing credential verification, embargo management, and basic quality control, they lower barriers to access and may help sustain science coverage where specialist journalism has declined. In this sense, intermediaries can support both high- and low-tension dynamics: They may enable journalism by lowering transaction costs while also stabilising institutional communication as a routine input into science news production.

From a high-tension perspective, however, these same infrastructures risk normalising a science-news ecology in which institutional material becomes the default input for journalism (Weingart & Guenther, 2016). When intermediaries prioritise efficiency, speed, and ready-to-use content, they may inadvertently amplify structural asymmetries between well-resourced institutions and under-resourced newsrooms (Brück

et al., 2025). Without parallel investment in independent reporting capacity, gatekeeping mechanisms alone are insufficient to safeguard journalism's critical watchdog role; this also extends to other roles, such as investigative journalism. Rather than resolving tensions between amplification and scrutiny, intermediaries may instead redistribute them across organisational and infrastructural layers.

These infrastructural dynamics are closely intertwined with increasingly blurred professional boundaries between institutional communication and journalism. In contemporary science communication ecosystems, distinctions between these roles are difficult to maintain, even at the level of individual actors. Many science journalists migrate into institutional communication roles in search of a new job, stability, and improved working conditions, often bringing journalistic norms and public-service orientations into PR. At the same time, some science journalists prioritise public education and popularisation over critical interrogation, adopting affirmative or enthusiastic tones rather than investigative scrutiny (Nelkin, 1995; Schäfer, 2017). It fits that most science journalists have a scientific background anyway (Guenther, 2019). Freelancers frequently operate across both domains, producing independent journalism in some contexts while undertaking commissioned writing for research organisations and companies in others.

Hybrid platforms such as *The Conversation* institutionalise these overlaps by embedding journalistic formats within structures anchored in academic expertise and institutional support (Guenther & Joubert, 2021). These arrangements blur the lines between amplification and watchdog roles, producing outputs that resemble journalism while operating under different accountability structures. As a result, many science communicators are not simply cheerleaders for science, and many science journalists do not consistently perform a watchdog function. These blurred boundaries are not temporary anomalies but enduring features of contemporary science communication ecosystems. Bucchi and Schäfer (2025) argue that public communication by scientific institutions and scientists is governed by persistent structural tensions including: tensions between attention, visibility, and credibility; openness and control; and autonomy and institutional alignment. They trace these tensions to broader structural developments and call for institutional and governance responses rather than a one-size-fits-all fix. Extending this argument, we suggest that tensions between institutional communication and science journalism are similarly redistributed across intermediary infrastructures and hybrid professional roles. In this sense, amplifiers and watchdogs are not fixed categories but relational positions shaped by systemic conditions, reinforcing the need for approaches that address governance, infrastructure, and power rather than professional conduct alone.

5. Towards a Constructive Framework to Protect Integrity in Interdependence Between Institutional Communicators and Science Journalists

Instead of advocating a return to strict professional boundaries that no longer align with real-world conditions, we propose a framework for constructive interdependence among institutional science communicators and science journalists, as illustrated in Figure 1. The framework is informed by scholarship that highlights how persistent structural tensions are reshaping contemporary science communication ecosystems (Bucchi & Schäfer, 2025; Schäfer & Fährnich, 2020). In these evolving landscapes, research organisations are emerging as increasingly dominant communicative actors, highlighting the need to balance demands on institutional and individual reputations, attention, and visibility on the one hand with accountability, transparency, scrutiny, and the public interest on the other. It responds directly to the structural tensions outlined in the preceding sections, recognising that both high- and low-tension dynamics

are enduring features of contemporary science communication ecosystems. The framework has four components—normative clarity, structural transparency, reciprocal respect, and ecosystem-level investment—that have been discussed widely in the science communication literature already but are brought together and discussed here in new ways.

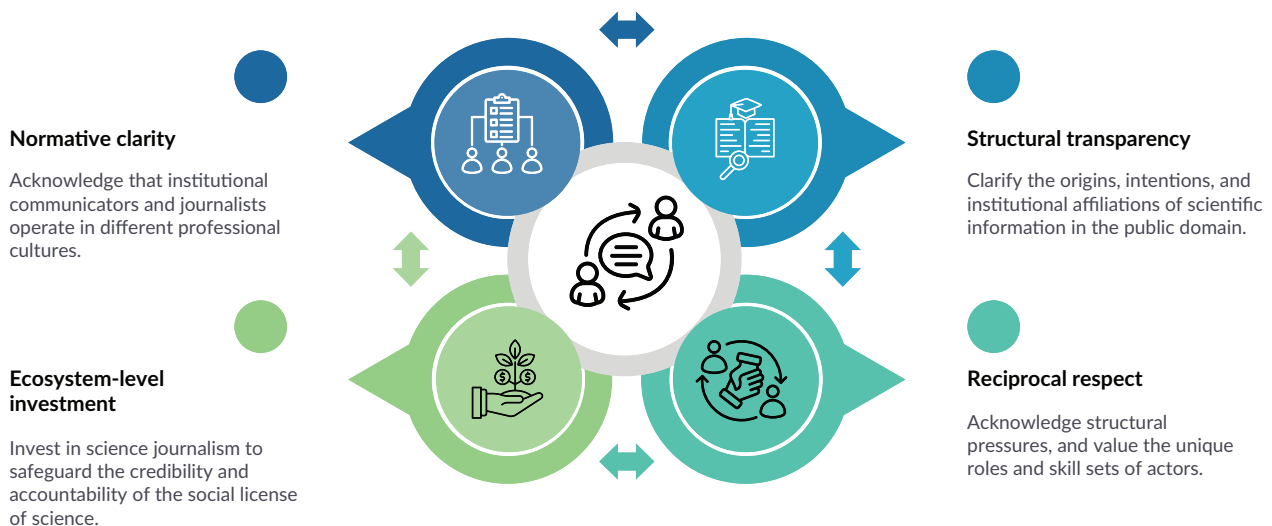


Figure 1. A suggested framework to support integrity and interdependence between institutional science communicators and science journalists.

The framework is neither intended as a set of professional best practices nor ethical prescriptions for individual actors. Instead, it offers an ecosystem-level intervention that identifies conditions under which collaboration, overlap, and mutual reliance can coexist with the protection of independent scrutiny, i.e., science journalism’s watchdog function of critically examining scientific claims and holding the institutions and actors that produce and communicate science to account. We view this framework as a starting point for a more concrete dialogue among scholars, science journalists, institutional communicators, and funders seeking to sustain independent scrutiny about how the principles set out below can be enacted through professional training, editorial policies, institutional guidelines, and funding decisions.

5.1. Normative Clarity

Both institutional science communicators and science journalists require clearer articulation of their distinct accountabilities and shared commitments to responsible science communication. Normative clarity involves recognising that, despite some overlaps in practical trajectories, institutional communication and journalism are rooted in different professional cultures (Peters, 2022; VanDyke & Lee, 2020). Institutional communicators work within organisational mandates focused on reputation, visibility, and stakeholder relations. Journalism, on the other hand, gains its legitimacy from independence, verification, and public accountability.

In hybrid communication settings where actors often collaborate, these distinctions can become blurry and difficult to navigate. Normative clarity is particularly important in these hybrid organisational settings where professional expectations are ambiguous or overlapping, as it helps delineate responsibility without denying interdependence. Clearly recognising role differences helps avoid the implicit expectation that communicators should act as surrogate journalists or that journalists should serve as cheerleaders for

science. Better understanding and acknowledgement of these differences should be put into practice through professional training, codes of ethics, editorial policies, and institutional communication guidelines.

5.2. Structural Transparency

As science communication increasingly circulates through institutional blogs, expert commentary platforms, and social media channels, it becomes harder for readers and viewers to distinguish between journalistic reporting, institutional promotion, and expert opinion, leading to concern about its long-term effect on public perceptions of and trust in science (Autzen, 2014; Weingart & Joubert, 2019). Transparency about the origins, intentions, and institutional affiliations of scientific information within hybrid media environments will help audiences to recognise this influence, enabling them to interpret information within its appropriate institutional contexts (de Oliveira et al., 2026). Transparency requires clear labelling of institutional or promotional content and the preservation of editorial independence in hybrid publishing formats.

5.3. Reciprocal Respect

Constructive relationships rely on mutual recognition of roles, constraints, and professional expertise. Institutional communicators operate under managerial pressures that prioritise strategic visibility, reputational considerations, and funders' expectations. Journalists, by contrast, frequently work within conditions of newsroom contraction, accelerated publication cycles, and limited resources. Recognising these structural pressures can foster more constructive professional relationships and reduce the tendency to interpret tensions as (ethical) failings. Reciprocal respect also involves recognising the unique skills that different actors bring to the science communication ecosystem. Institutional communicators are catalysts and matchmakers that bridge the worlds of science and journalism, making science more visible and accessible to society. Journalists, in turn, have professional skills in translating, contextualising, and transferring complex knowledge to make it accessible and meaningful to their readers and viewers. They also have a duty to reflect critically on science and the production of new knowledge. Constructive collaboration depends on recognising the need for these complementary roles and skill sets (Besley & Nisbet, 2013; Dunwoody, 2008; Peters et al., 2008). Reciprocal respect does not imply the absence of critique. Instead, it recognises that different actors contribute distinct types of knowledge and professional skills to a shared communicative ecosystem. Reciprocal respect is therefore not a personal disposition that communicators or journalists are simply urged to adopt but a condition to be embedded in the structures that govern their interaction, such as editorial standards, professional codes, joint training, and intermediary organisations such as science media centres. The intended readers of this principle are thus not only individual practitioners but also the editors, communication managers, professional associations, and funders who design and maintain these structures and are positioned to translate mutual recognition into durable institutional practice.

5.4. Ecosystem-Level Investment

Changing media business models and digital publishing environments have reshaped journalistic roles and resources, raising concerns about the capacity for sustained independent scrutiny of science (Dunwoody, 2014; Fahy & Nisbet, 2011). Since science journalism's crucial watchdog role is under threat, it requires material support, not just normative commitment. Independent science journalism relies on editorial

strength, specialised expertise, and institutional safeguards that enable journalists to scrutinise scientific claims and organisational practices. In media ecosystems where newsroom resources are shrinking, overdependence on institutional communication risks creating information environments dominated by content with a promotional slant. Supporting independent science journalism should therefore be seen as an investment in the credibility and accountability of science communication ecosystems and a long-term structural safeguard for science's social licence.

Taken together, these four principles emphasise that the sustainability of science communication ecosystems relies not on eradicating tensions between institutional communication and journalism, but on managing those tensions in a way that maintains both accessibility and accountability. We hope that these principles help to reframe the relationship between institutional communication and journalism as one of managed interdependence. This is a normative aspiration rather than a description of current relations as either unresolved conflict or forced convergence. In this view, protecting journalism's watchdog function is not solely a journalistic responsibility, nor can it be secured through ethics alone. It is a shared, ecosystem-level responsibility that must be institutionally enabled, materially supported, and normatively defended within contemporary science communication ecosystems.

6. Conclusion: From Binary Opposition to Shared Responsibility

The amplifier–watchdog distinction remains analytically useful, but only when understood as a productive tension rather than a moral hierarchy. Science journalists and institutional communicators are neither adversaries nor interchangeable actors, but interdependent professionals operating under unequal structural conditions. Reframing this relationship, therefore, requires shifting analytical attention away from ethics and professional purity towards questions of governance, infrastructure, and power.

Protecting journalism's watchdog function is not a matter of asking communicators to be less strategic or journalists to be more resilient. It is about recognising independent scrutiny as a public good that must be institutionally enabled, materially supported, and normatively defended within contemporary science communication ecosystems. From this perspective, the future of science journalism cannot be secured by any single profession or actor. It is a shared responsibility across communicators, institutions, intermediaries, and potential funders—one that demands sustained commitment to holding science to account.

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The Emerging Practices of Watchdog Science Journalists in Ibero-America

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Abstract

Watchdog science journalism (WSJ)—investigative journalism whose objects are scientists and scientific institutions—is an important way of complying with the public service commitment of journalism. It is also one of the instruments to uphold the integrity and independence of scientific research in the face of misconduct, corporate and political interference, ideological manipulation, and scientific misinformation. But science journalists often find themselves in a “too close for comfort” relationship with scientists, which can compromise their critical stance. This problem is even harder in Ibero-America, a cultural region encompassing Spain, Portugal, and Latin American countries. Here, investigative journalism has historically been less prevalent, and science journalism consolidated later. But recent outstanding journalistic work suggests the emergence of a vibrant investigative science journalism scene in the region. In this study, we explore this development by interviewing 15 journalists from Ibero-America who have carried out outstanding WSJ on science, health, and technology. Based on their answers, we identify practices, values, impacts, barriers, and facilitators of WSJ in the region. We also identify what they perceive as constraints specific to Ibero-America, including political interference, lack of transparency, disabling newsroom culture, precarious funding, problematic relations with scientists, misuse of results, and job and psychological instability. For each of these challenges, we also identify enabling actions that are fostering or could foster WSJ in the region. Our work signals a departure from historical trends and ingrained practices, calling for a reconsideration of the contribution of Ibero-America to global science journalism.

Keywords

Ibero-America; investigative journalism; journalism practices; science journalism; watchdog science journalism

1. Introduction

In this article, we define watchdog science journalism (WSJ) as the investigative journalism whose object is the social process of science, the behavior of scientists, and the functioning of scientific institutions. According to Fleerackers et al. (2026), it encompasses a large variety of topics, including retractions, questionable scientific practices, plagiarism, falsification, image manipulation, fabrication, fraud, misconduct, corporate manipulation, political manipulation, conflicts of interest, abuse (sexual or of other nature), and misinformation spreading by scientists. WSJ can be classified as a subset of investigative science journalism: While the latter investigates any subject related to science (Gross, 2018), the former scrutinizes specifically the social processes involved in it.

We focus on Ibero-America, a cultural region encompassing Spain, Portugal, and Latin American countries (akin to similar cultural regions, like the Francophonie). Although Ibero-America has many differences, such as diverse media systems and political specificities, Castillo (2013) maintains that it is also an area with shared interests and common themes. Precisely, Kunsch (2013) argues that scholars and practitioners recognize the commonalities of this zone, bringing together the challenges and realities they face. Science journalists in particular have historically self-organized more in Ibero-American associations than in national ones (Massarani & Magalhães, 2024). Hence, comparison can illuminate some paths of specialized science journalism in a non-Anglophone zone and in a complex cultural region that identifies itself as such.

In this region, science journalism consolidated later than in other areas, such as the Anglophone area (Massarani et al., 2025), and investigative journalism faced historical challenges (Michener et al., 2025). However, recent cases, such as a high-profile investigation into widespread misconduct among highly cited researchers (Ansele, 2023), among others, suggest the emergence in Ibero-America of an investigative science journalism scene, focused specifically on scrutinizing the behaviour of scientists and the functioning of scientific institutions—that is, WSJ in terms of Fleerackers et al. (2026).

To investigate this emerging sector, we have conducted a qualitative, exploratory study focusing on practitioners who have carried out WSJ in the region. Our research questions are: What are the practices, values, impacts, barriers, and facilitators of WSJ in Ibero-America? What aspects of it do practitioners identify as specific to the region and its countries?

To fulfill our objectives, we carried out qualitative interviews with 15 practitioners from nine countries in the region (Argentina, Bolivia, Brazil, Colombia, Mexico, Peru, Portugal, Spain, and Venezuela), covering health, science, and technology in a variety of different outlets. While this sampling does not cover all the region's diversity, it contributes to minimizing gaps in mapping the practices of WSJ outside the Anglophone world.

2. Literature Review

2.1. Watchdogging as an Investigative Journalism Practice

Several scholars and journalism theories sustain that investigative journalism focuses on scrutinizing and exposing corruption, malfeasance, fraud, and abuses of power by government and other institutional elites (Carroll, 2024; Frías Vázquez et al., 2024; Knobel, 2018). It acts as a “custodian of conscience” by making

visible the hidden actions of those in power (Márquez-Ramírez et al., 2020; Mellado, 2020). The extended literature calls for independent scrutiny by journalists, with a skeptical examination of power entities (Knobel, 2018; Márquez-Ramírez et al., 2020). Independence is crucial for documenting, questioning, and investigating institutions or elites to provide clear information on issues of public interest (Bennett & Serrin, 2005). As sustained by Márquez-Ramírez et al. (2020, p. 103), “journalists must always act as critical watchdogs of established powers.” In this sense, as Coronel (2010) argues, investigative journalism has been interchangeably associated with the watchdog role.

Unlike hard or breaking news, this watchdog function requires deep and sustained research. Therefore, a significant investment of time, resources, and effort is needed to “ferret out” hidden facts (Coronel, 2010; Knobel, 2018).

As such, investigative journalism requires the production of evidence over the hidden facts, which involves procedures such as interviewing, analyzing different documents, actively contrasting sources, making field observations, and not working solely with secondary data, leaks, or official statements (Bennett & Serrin, 2005; Knobel, 2018; Mellado, 2020).

Coronel (2010) maintains that the best investigative journalism goes far beyond exposing wrongdoing by corrupt or bad actors, but also examines the systemic flaws that enabled it. In this sense, it investigates not only the laws and regulations violated, but also how institutions actually work compared with how they should, and details who is responsible for the institutional failures and their consequences. In this context, although investigative journalism has been interchangeably associated with watchdog, Coronel (2010, p. 138) sustains that “watchdogging is the exposure of wrongdoing in the public interest.”

In the context of growing global disinformation (Bechmann, 2020; Bennett & Livingston, 2018) and declining trust in news (Goyanes et al., 2023), Ferracioli et al. (2022) identified that public attitudes toward the press watchdog role can be positively associated with trust in news, but paradoxically also with higher levels of news avoidance (Newman et al., 2025). Investigative journalism, and watchdogging as a practice of it (Coronel, 2010), can therefore be key elements in recovering the public sphere from informational disorder.

De Burgh (2021) explains that although investigative journalism may be a global practice, it is not universal when cultural differences and regional contexts are considered. Hence, we should consider the particularities of Ibero-America as a cultural region with common political trends: a long shadow of authoritarian regimes, which remains; a considerable number of young democratic constitutions preceded by military regimes in the 20th century; populism; and several threats to freedom of expression (Michener et al., 2025). Consequently, journalism and the media system have had their own historical trajectory, shaping the development of journalistic practices, such as investigative reporting.

In fact, Guerrero (2014) proposed that many Latin American countries have media systems built on an apparently liberal model, in which private and commercial media prevail. Nevertheless, the press is “captured” by political and economic elites, constraining effective regulation and undermining watchdog capacity. Spain and Portugal, in turn, although their media systems were also shaped by late democratization, have a “polarized pluralist model” in which political parties and state power are intertwined with the media (Hallin & Mancini, 2012).

Cultural specificities make it difficult to generalize about the state of watchdog practices in Ibero-America. However, some key points can be drawn from Mellado's (2020) comparative approach for forecasting cultural investigative journalism practices in the region. In Spain and Portugal, the press performs at a very high level of watchdog journalism, with practitioners conducting original reporting and raising their voices against abuses of political and economic power, corruption, and wrongdoing. In many Latin American countries, due to the captured liberal media system, however, watchdog roles very often focus solely on political corruption while largely ignoring private and corporate wrongdoing.

2.2. WSJ

Investigative science journalism may be defined with the same criteria as investigative journalism in general (independence, critical scrutiny, deep work) but with a focus on the realms of science, health, environment, and technology (Gross, 2018). Several different practices are compatible with this broad definition: from investigating stories related to health, environment, forensics, or other issues by using scientific evidence (Eban, 2022), to "science-based investigative journalism" (Fahn, 2022), a practice that employs tools of scientific inquiry, like technical databases or satellite imagery.

Another branch of investigative science journalism is WSJ (Fleerackers et al., 2026). In this case, the object of investigation is science itself, as a social process. The investigative nature of this type of journalism consists of holding scientific communities and institutions accountable to the public. In this sense, WSJ encompasses the application of Coronel's (2010) idea of watchdogging.

Based on fieldwork in Canada and the UK with science journalists, Fleerackers et al. (2026) have identified issues considered as watchdog reporting claims, such as retractions, fraud, problematic uses of data or sampling, paper mills, predatory journals, plagiarism, GenAI use, among other science integrity issues; alongside others linked to problematic human behavior, including breaches of equity and diversity and harassment; or even funding-related problems, conflicts of interest, inappropriate public expenditure, and science misinformation. More than a thematic catalog, what they have in common is the watchdogging practice of exposing wrongdoing in the public interest.

WSJ can be seen as a response to a "too close for comfort" relationship between science journalists and scientists, which compromises journalists' critical stance (Rensberger, 2009). Instead of acting as "watchdogs," science journalists often serve as "cheerleaders," merely promoting scientific innovations to the public ("Cheerleader or watchdog?," 2009). Science is highly effective in shaping the media agenda (de Semir et al., 1998). Science journalists often seem to be sentenced to limit their reporting efforts to celebrate and applaud scientists and their achievements (Walsh-Childers & McKinnon, 2024). On the contrary, WSJ casts a critical eye over the scientific sphere.

WSJ can also be seen as a response to increasing concerns about scientific integrity (ALLEA, 2023). For example, 2,9% of researchers admit having committed falsification, manipulation, or plagiarism, and 12,5% admitted to other forms of questionable scientific practices (Xie et al., 2021). Beyond breaches of research integrity, WSJ also puts other aspects of science that raise public-interest concerns in the spotlight, such as hype (Sumner et al., 2014), corporate interference (Oreskes, 2025), ideological bias (Saini, 2019), and pseudoscience (Deer, 2011).

While WSJ can play an essential role in tackling these issues, it also risks providing ammunition to stakeholders who promote political or corporate interests contrary to scientific evidence. The tobacco industry used criticism of “junk science” to advance a supposedly “sound science” agenda that discredited evidence linking secondhand smoke to disease (Ong & Glantz, 2001). Similarly, the movement to improve research is now being weaponized to promote a so-called “gold standard science” that contradicts scientific evidence (O’Grady, 2025).

In Ibero-America, investigative journalism has been historically more challenged than in other parts of the world (Michener et al., 2025). Science journalism has deep historical roots in the region (Gascoigne et al., 2020), but the starting point of its professionalization and legitimization is often associated with the creation of the Ibero-American Association of Science Journalism in 1969 (Massarani & Magalhães, 2024). Contrary to what happened in other parts of the world, science journalists first self-organized as Ibero-American, and only later formed national associations. By the mid-seventies, the membership of these organizations was still one or two orders of magnitude lower than those in the English-speaking world (Massarani et al., 2025). Therefore, the consolidation of science journalism in the region is often dated to the ‘80s—later than in other parts of the World. Moreover, almost no country in the region was among the world pioneers in creating science journalism associations, awards, radio programs, or TV shows, and most of them took these actions in the middle or late phases in the history of global science communication (Gascoigne et al., 2020).

The “uncomfortable closeness” between science and science journalism is more intense in Ibero-America than elsewhere. As Massarani et al. (2025) argue, in the region, science journalism achieved professionalization in a political context of authoritarian modernization, which was reflected in a coverage that framed science as politically neutral and economically beneficial. The associative movement that contributed to its legitimization was not led solely by journalists (as in other parts of the world), but also by scientists. Science journalists in Ibero-America have often presented themselves as advocates for science and spokespersons of the scientists (Rosen & Cruz-Mena, 2015). At the same time, they have shown a tendency to avoid controversial issues (Massarani & Buys, 2007). Less than one in ten science journalists in Latin America and the Caribbean mention being a public watchdog among their main roles, well below other functions such as informing, explaining science, and promoting it (Massarani et al., 2022). The confusion between science journalism and science popularization is also reflected in the academic literature on science journalism in the region (Angulo-Giraldo & Felipa-Anchante, 2024).

At a time in which journalism is challenged, and its democratic function is put in jeopardy (Newman et al., 2025), research can shine a light on the conditions that hamper and facilitate that function and point to actions to uphold it. Our work aims at contributing to the exploration of those conditions in the specific case of WSJ, a branch of journalism that plays a crucial function in the accountability of science—a role that is especially relevant at a time of a deepening integrity crisis (Xie et al., 2021).

WSJ is a little-studied subject, and research has focused mainly on English-speaking, Global North countries (Fleerackers et al., 2026). Our work aims to start to fill this gap by exploring its practices in Ibero-America, a region where languages other than English are prevalent and that encompasses many Global South countries. The literature discussed above has highlighted the special challenges of both investigative and science journalism in the region. Our work tries to give an insight into how journalists in the region are dealing with those challenges.

3. Methodology

This study examines WSJ in Ibero-America through interviews with 15 high-profile journalists who have produced outstanding investigative reporting in science, health, environment, or technology. Candidates were identified through two sources: (a) the authors' contextual knowledge (professional experience and the PerCientEx project (Percientex, n.d.), an Ibero-American initiative to identify and promote quality and best practices in science journalism); and (b) expert consultations, as described below.

At the early stages of our field research, we consulted 26 experts by email: senior journalists, editors, leaders of science communication associations, members of journalism organizations, science sleuths, and science communication scholars (see Supplementary File Appendix A). Experts typically provided a journalist's name and examples of relevant work. When experts suggested only a media outlet, or named a journalist without specifying a piece, we located pertinent WSJ by that author, by web searching the outlet's or journalist's name combined with scientific wrongdoing-related keywords ("retraction," "misconduct," "manipulation," "conflict of interest," "plagiarism," "falsification," "fabrication," "fraud," and "abuse") in Spanish or Portuguese.

This process yielded a list of 54 journalists. From this pool, we selected 15 interviewees for qualitative analysis. Eight were identified through contextual knowledge and 11 through expert suggestions (one overlapped across both sources). Selection was based on review of candidates' work and sampling constraints, using the criteria summarized in the Supplementary File Appendix B. Appendix C provides a detailed description of the sample and a summarized profile of the 15 interviewed journalists. Extended profiles are contained in Appendix D. The journalists in the sample work in Spain (four), Argentina (two), Peru (two), Portugal (two), and Bolivia, Brazil, Colombia, Mexico, and Venezuela (one each). They are predominantly female, with journalism-oriented education, mid-career or experienced, and hold a staff position in a media outlet. Most watchdog work dates from 2018 to 2025 and was published in newspapers (six), native digital outlets (four), magazines (four), television (one), and a book publishing house (one). The most common watchdog topics concern questionable research practices and misconduct, followed by corporate manipulation and conflicts of interest (notably involving pharmaceutical and tobacco companies), sexual harassment, and misinformation. By including a number of corporate manipulation cases, our work expands the range of WSJ explored in previous literature (Fleerackers et al., 2026).

Qualitative interviews have been consistently used in the social sciences field as a strategy to capture how social actors interpret and explain their universe, process, or practices (Knott et al., 2022). As Arfuch (1995) sustained, it is an interactive method in which the interviewer is also a coproducer of the discursive output. Therefore, it must be considered a negotiation of meanings and identities among the dialogical parts. Although this must be noted as a limitation of our study, it allows us to capture in-depth views on our research questions, namely on the practices, values, barriers, and facilitators of WSJ in Ibero-America, and on specificities of the region based on practitioners' views. Appendix E contains the detailed description of how the interviews were conducted and analyzed, the ethical protocol, and the script of the questions posed to journalists.

4. Results

4.1. Practices

Regarding sources, the interviewees identified science insiders as the main source of WSJ stories, including institutional whistleblowers and informed outsiders. This relationship follows a self-reinforcing feedback loop: Journalists said that publishing WSJ stories increases the likelihood of receiving similar tips. Another source is the news agenda: public announcements, press releases, other media, and social networks. Yet interviewees stressed the importance of detecting gaps in that agenda rather than merely replicating it. For example, journalists investigated sexual abuse in Mexican and Argentinian academia after noticing that similar cases had emerged elsewhere while remaining unexplored nationally. Other occasional sources include official documents, such as laws, regulations, and bulletins; academic and specialized events; Retraction Watch; and readers' tips.

As for selection, the decision to pursue or drop a lead reveals interviewees' views on the journalistic value of science watchdog stories. A key reason to pursue a story is the classic investigative commitment to uncover wrongdoing hidden by the powerful. However, most interviewees noted that this condition is not sufficient for WSJ. The technical nature of science sets a higher bar: "The public doesn't always recognize the general interest served by investigative journalism focused on scientific activity. It's difficult to make people understand why it's important and why it matters to society" (AB). Thus, assessing public interest becomes crucial. Interviewees used proxies such as relevance to audiences' real lives, the number of people affected, and the topic's presence on social media. For example, misconduct related to cancer or Covid-19 is more likely to trigger a story than misconduct on more abstract topics. Another key selection criterion is the profile of the scholars and institutions involved; national scientists or high-profile researchers often increase a story's appeal. In Latin America, the political edge of WSJ stories was sometimes decisive, particularly in legacy media. One journalist noted that politicians' involvement in Peruvian universities enabled a story on paid authorship, while another politically charged story concerned a Colombian minister's curriculum vitae.

Regarding methods, journalists reported using a wide range of them, some case-specific and others recurrent. Extensive online searches in open or paywalled sources are the most commonly mentioned method. Search engines and keyword-based web alerts often lead to relevant documents (including spreadsheets and presentations) and help detect conflicts of interest. Journalists also consult specialized archives such as international trade databases, health registries, company registries, public procurement records, legal repositories, and databases assembled by investigative journalism organizations. Scientific databases are central: publication databases (Google Scholar, Scopus), scientist rankings, predatory-journal lists, and Retraction Watch. Several journalists reported analyzing research papers not only for scientific claims but also for metadata (affiliations, funding, declared conflicts of interest). When information was unavailable, several interviewees used access-to-public-information requests.

Interviewees conducted on- and off-the-record interviews with numerous sources, often dozens. Two types were especially valuable: researchers familiar with the institution under investigation but not tied to it, such as former employees or scientists abroad; and "allied scientists" who help interpret technical issues without necessarily being cited: "I always try to find a source that isn't one I'm going to cite, but rather one that I need to explain things I don't understand so I can write them better" (PM). Additional sources included people affected

by wrongdoing and organizations, such as networks of women scientists. In some cases, interview testimony can substitute for documentary proof when multiple independent sources corroborate the facts. However, journalists also stressed the need to assess sources' conflicts of interest to avoid being instrumentalized by groups with hidden agendas, such as campaigns to discredit colleagues, and one emphasized offering a right of reply to those accused.

Trust-building was presented both as a practical route to further disclosures—"You gain the trust....Then they start [to open up]" (MA)—and as an ethical obligation, given risks of retaliation—"We have learned to protect sources....Part of our work is to coach them" (RPO). Beyond voluntary interviews, some journalists mentioned more intrusive tactics: infiltration (posing as a scientist to investigate authorship-for-sale networks) and hidden recording (suggested to a source to obtain proof of abuse).

Lastly, regarding time and frequency, WSJ work requires a time investment above the usual news cycle turnaround. Reported times to prepare a story range from two days to over a year. These are not equivalent to full-time commitments, since journalists often do this work alongside routine reporting. In general, journalists say they need to strike a balance between everyday reporting and in-depth work, which makes WSJ infrequent. Several journalists report they carried out the bulk of their investigations outside working hours or between urgent assignments: "Time is the main barrier, because my job is not uncovering corruption cases in science. It's doing science journalism in general" (MA).

4.2. Motivations and Impact

When asked about their motivations, many appeal explicitly to the investigative journalism ethos:

My role is not to say whether something is right or wrong. My role is to raise issues, to open up debate, and to ensure the public is informed....When things are public knowledge, society is freer and can decide for itself, instead of having decisions made for it. (BP)

These statements are often accompanied by emotional expressions, underscoring the importance of psychological incentives: "Every time I have a story, I feel butterflies in my stomach" (LG); "it's sort-of an addictive thing....I get indignant when I discover things that people ignore" (PM); "there are incredible human stories, and this is what motivates me to continue" (BP); "journalists have an immense love for their profession and their mission...improving other people's lives is what motivates me" (VN).

Some journalists explicitly pit investigative journalism values against the usual practice of science journalism:

In science journalism, there's an easy path: simply publishing studies that appear in journals like *Cell*, *Nature*, and *Science*. And in the end, we all publish the same things....Well, I don't like that. I prefer to do the research; I find it much more relevant and engaging to seek out original and relevant topics. To try to break news first. (MA)

In one of the interviews I did...to ask about this case, they said to me, "But why do you have to do this?" And at that moment, I really thought, "Wow, this can't be happening." I mean...it's our job as journalists to ensure transparency, not to allow these cases to be covered up. (CS)

Interviewees display a vision of science as a socially constructed activity: “This journalism shows society a different notion of science. Not the lonely genius in his lab. Science is also social processes: groups, resources, money, debates, etcetera” (PC); “it’s not journalism that distrusts science, but rather one that scrutinizes the power dynamics that permeate science” (FT). However, several interviewees imply a clear boundary between what is socially constructed and what is not: “We don’t put the scientific method in question....We separate bad practices from science as a knowledge-producing system” (FT).

Interviewees occasionally report that their work has been questioned for damaging trust in science: “There were people saying that this [work] conveys the image that all scientists are dishonest” (MA). Other interviewed journalists reply that, on the contrary, their work improves trust in science: “That a person does irregularities or mistreats his team does no favor to the [scientific] system....One must remove those that are poisoning the system. They make you lose trust in it” (CS); “normalizing the fact that [those] who work in science are flesh-and-blood people...helps to consolidate rights, and encourages more people to want to dedicate themselves to science” (AB).

At the same time, journalists are aware of the weaponization of the criticism of science carried out by authoritarian governments and disinformation mongers: “Today, the government itself wants to dismantle the scientific system in Argentina. It’s difficult to do investigations that challenge Argentinian science because of what’s happening” (FB). FT mentions the risk of vaccine denialist movements using critical reporting on the handling of vaccines to foment skepticism about vaccines themselves.

Journalists also shared strategies they deploy to shield their reporting from that kind of manipulation. Some of them insisted on the importance of drawing a clear line between scholars involved in wrongdoing and those who aren’t, for example by involving respected scholars to comment on their story. Another strategy is balancing WSJ with more positive science reporting. A third strategy consists of focusing on the process of science, not only on its results, as a way to make uncertainty explicit.

Regarding the impact of WSJ, the general perception among interviewees is that their work contributes to triggering changes. A large majority of interviewees reported practical impacts of their work, although some said these impacts were not sustained over the long term. Others said their work did not trigger any change. Reported impacts on individuals include resignations, scholars partially admitting wrongdoing, and victims expressing gratitude. More systemic reported impacts include new regulations or laws, new protocols, lawsuits, and contributing to sparking protests. The journalists who reported no impacts of their work point to the scientific community, administration, or politicians ignoring their work, protecting the reputations of questioned scholars, or going back to their old ways after a resignation.

4.3. Barriers and Facilitators

In this subsection, we discuss what factors hamper or foster WSJ in Ibero-America, according to how the main stakeholders report being impacted by—or influencing—them.

In regard to journalists, a staff position facilitates WSJ, according to several interviewees, because it provides job security, covers reporting costs, and offers legal protection. Freelancers reported structural constraints: WSJ is typically paid at the same rate as less time-consuming assignments, and legal support is

not automatic. Only one freelancer—working for an international science-specialist outlet—was paid by the hour and had legal protection specified in his contract. Specialization is another enabler: training or long experience in science journalism supports technical understanding, familiarity with scientific institutions, and access to scientific source networks that can suggest stories and provide expert commentary. A third facilitator is managing mental-health strain. A majority of journalists described WSJ as producing fatigue, obsessive work patterns, stress, anxiety, exhaustion, exposure-related distress, fear of errors or retaliation, backlash from online harassment, frustration at limited impact, and regret about insufficient time for investigative work: “The weeks before publishing I had nightmares...I dreamt that somebody recognized me in the street and attacked me...also because, coming from science journalism, this is not the type of stories you expect to do” (RPO). They cited coping strategies such as editorial and peer support, regular breaks, and alternating with less controversial stories.

As for collaborators, many journalists published WSJ as co-authors, often pairing science/health reporters with law, data, or investigative journalists to add expertise in freedom-of-information requests and legal frameworks. One journalist involved a woman co-author in a sexual-harassment investigation to allow victims to choose to speak with another woman. Even when bylines were individual, journalists emphasized the value of being embedded in a newsroom to discuss findings and share workload, while a freelancer regretted lacking a larger team. Two interviewees collaborated transnationally on tobacco-industry manipulation of evidence and highlighted the importance of investigative networks: “One of the advantages of [Ibero-America] is the networks that are being built. A large part of my expertise comes from these networks” (LI).

Concerning editors, several journalists described “breaking-news” newsroom cultures—organized around speed and volume—as a structural barrier: “Most media engage in double-talk. They call for journalistic quality, but every single structural decision they take goes against quality” (PC). Some indicated their outlets were genuinely committed to investigative reporting; this was common to all those that work for native-digital or specialized outlets. Meanwhile, others attributed it to the financial independence of their outlet from economic and political power. It is among native-digital outlets, specifically those that fiercely promote their financial independence from corporations, that we found a lot of WSJ involving private sector stakeholders, especially pharmaceutical or tobacco companies. Yet journalists also highlighted that these kinds of outlets face challenges because of their precarious funding (subscriptions, donations, grants). Strategies that foster WSJ include dedicated investigative teams and routines that protect time for in-depth work, and interviewees stressed that editor commitment is decisive: supportive editors approve high-risk pitches and help make stories legally defensible—“The biggest issue right now in legacy media newsrooms is having leaders that actually care about this kind of thing and are not worried about publishing [just] the next...news” (RB).

As for journalism funders, most of the interviewees’ stories were funded through routine newsroom resources, but some journalists reported foundation grants supporting some WSJ investigations; others had received grants for other projects, and several outlets cited grants as part of their revenue mix.

Regarding scientists, “allied scientists” are often mentioned as sources, explainers, commentators, or co-investigators: “Watchdog science journalism is not only journalism. It’s a joint investigation [with experts]” (LI). The majority of journalists reported receiving public or private recognition from scholars after

publication. However, nearly all interviewees confronted strong secrecy—off-the-record conditions and anonymity were widespread: “Heavyweight scientists remained all off the record. No one wanted to speak out. I found it sad and frustrating” (CS); “when someone is seen acting improperly, what usually happens in an institution is that almost no one says anything. Scientific communities are afraid to confront them” (PC). Several described a “code of silence” rooted in loyalty (“in a plagiarism story, there was a lot of resistance from scientists. They said it was an isolated case,” FB), complicity (“who would dare to report [a papermill case]?...There was a complicit silence among them all. Everyone was getting something out of it,” JMH), or fear (“there are many vertical structures that promote this kind of “Messi of science” who is allowed to do anything. Everyone knows, and everyone turns a blind eye,” CS). Self-censorship can also extend to journalists, depending on the degree of dependence they have on scientific institutions. Some interviewees highlighted that having a position outside science allows journalists to be more critical. But others pointed out that science journalists are not real outsiders: “I was telling things that bothered the medical community, but the medical community is my source of information....I said [to myself], is it in your best interest to be at odds with the people you have to work with?” (BP). On the other hand, some journalists reported open hostility from scholars, including questioning journalists’ integrity, tipping off investigated actors, and aggressive communications.

Some journalists pointed to low scientific literacy in their audiences as an obstacle for WSJ, yet many more reported above-average performance of WSJ stories in virality, metrics, comments, follow-up coverage, and private praise: “[These stories] contain all elements of journalistic interest: famous characters that fall because they do bad things; respected institutions that are perverse inside” (PC). However, popularity sometimes generated online hate: Five journalists reported online harassment from supporters of questioned scholars and from misogynistic actors.

Relating to administration, several interviewees emphasized that access to data and accountable administrations are extremely important for WSJ, while authoritarian practices proactively obstruct information (as described by one journalist in the case of Covid-19 casualties in Venezuela). Still, difficulties were reported across regime types: freedom-of-information laws are perceived to be weakly implemented (resulting in long delays to access public information), and press offices can function as barriers rather than facilitators.

Regarding the legal system, some journalists in our sample have been sued for WSJ stories; one pre-selected journalist declined to participate due to an ongoing lawsuit; and two received lawsuit threats. In one case, the fear of being sued led to a substantial editorial change (withholding the name of an allegedly abusive scholar). Mitigation strategies included extreme evidentiary rigor and pre-publication legal review.

Lastly, concerning the political system, watchdog science journalists operating under authoritarian practices feel threatened. A journalist from Venezuela reported fearing for her family and being worried about communication surveillance or movements around her house. Journalists from Peru and Argentina noted that “autocratizing” trends could restrict independent outlets. But political interference was also reported in democratic settings. For example, a Spanish journalist reported political pressure to give up her investigation.

5. Discussion

Our work highlights a set of constraints and opportunities for WSJ in Ibero-America. In this section, we interpret them in the light of existing literature.

With respect to political constraints, our findings are consistent with Guerrero's (2014) proposal on the capture of the press by political and economic elites in Latin America. In that region of Ibero-America, some WSJ stories could make their way in legacy media precisely thanks to their political edge.

Another of our findings is consistent with the focus of Latin American investigative journalism on political corruption at the expense of coverage of corporate wrongdoing, as observed by Waisbord (2010). We found this type of coverage (focusing especially on tobacco and pharmaceutical companies) mostly in native digital outlets that don't depend on corporate funding. "Political grip" and "influences of non-science vested interests" are two of the main problems facing science journalism in the Global South, highlighted by Nguyen and Tran (2019). Of the Latin American science journalists who answered a 2022 survey, 56% said political or corporate spin was one of the main problems they faced, while 24% mentioned a lack of editorial freedom, and 20% outright censorship (Massarani et al., 2022).

The degree of political interference with journalism in our sample varies widely across the region. Our interviewees mention limitations on freedom of the press in Venezuela, policies that threaten it in Argentina, and unaccountable institutions in Peru. Throughout Ibero-America, there is an almost unanimous complaint about the deficient application of laws regulating access to public information.

Some of our observations may be interpreted in light of Mellado's (2020) remark that the Spanish press exhibits higher levels of watchdog journalism than in other Ibero-American countries. In particular, our methodology identified more WSJ examples in Spain than in any other country in the region, distributed across national, regional, and native digital media. However, this interpretation is tentative because our methodology does not generate a statistically representative sample. Moreover, the Spanish press is also affected by political interference, as observed by Hallin and Mancini (2012). For example, the most prominent attempt at political derailment of a WSJ story was found in a Spanish outlet.

At the level of outlets and editorial policies, the constraints on WSJ highlighted by our interviewees present a paradoxical picture. On the one hand, legacy outlets provide stability, legal protection, resources, and support from editors and colleagues. On the other hand, many of these outlets are taken over by a breaking news culture that sidelines in-depth work.

In the 2022 survey of science journalists in Latin America, 57% cited pressure to provide audience-attracting news as one of the main issues they face. Nguyen and Tran's (2019) assessment of the challenges of science journalism in the Global South also mentions the dominance of straight news over analytical coverage. Our findings show that these issues also partially affect science journalists in Spain and Portugal.

However, there are notable exceptions throughout the region: first, legacy outlets in which editors value and give time for investigative work; second, international outlets specialized in science, which are portrayed as spaces in which to conduct high-quality WSJ, offering good pay and legal protection, and sometimes

allowing the results to be presented in national outlets; and third, independent native digital outlets devoted to investigative work. This last group, however, experiences financial strain. Two journalists from these outlets noted feeling threatened by reduced support from journalism funders.

The main constraint on WSJ with respect to its relationship with the scientific community is its “too close for comfort” relation (Rensberger, 2009). Massarani et al. (2022) found that 63% of surveyed Latin American science journalists considered it acceptable to become friends with their sources. Science journalism is closer to popularization than to investigative work in Latin America in particular (Rosen & Cruz-Mena, 2015) and in Ibero-America in general (Angulo-Giraldo & Felipa-Anchante, 2024). Several interviewees feel challenged by the fact that scholars are both sources and objects of scrutiny. The issue is especially critical for journalists in small countries, where elites are more interconnected. However, the responses of our sources (see Section 4.3) suggest that this constraint may be less severe for journalists who act more as outsiders than insiders to science, and whose range of sources is broad enough to be able to risk losing access to some of them by reporting on their potential wrongdoings.

With respect to this point, it is remarkable that many more journalists in our sample have a journalistic education than a scientific one. While the latter is framed as a way to gain an insider view of science, it may also cement loyalty to the scientific community, making it harder to develop a critical stance.

The reported impact of WSJ on science (resignations, regulations, and victims’ empowerment) shows it may play a crucial role in addressing the mounting integrity crisis (Xie et al., 2021). And journalists are also aware of the potential misuse of their work for doubt-mongering on sound science (O’Grady, 2025)—especially by promoting health pseudoscience in Latin America—and have developed a range of strategies to minimize this risk (see Section 4.2).

The constraints on WSJ at the level of individual journalists paint this activity as a fragile endeavor. Staff journalists face overtime and psychological strain, while freelancers face insufficient pay and legal vulnerability. Low salaries, in particular, were identified as the main issue faced by Latin American science journalists by 77% of respondents in Massarani et al.’s (2022) survey. Two of the members of our sample had left journalism at the time of our interview, and a third had become freelance to break out of an exhausting newsroom routine. A Venezuelan, a Colombian, and a Mexican journalist also expressed fears of physical attacks. On the other hand, many journalists in our sample mentioned the crucial support given by networks of like-minded professionals. This was especially evident in smaller countries with fewer specialized journalists.

6. Conclusions

Our work suggests that many WSJ practices in Ibero-America resemble those found elsewhere (Fleerackers et al., 2026), generating shared challenges—from dwindling resources and newsroom culture to legal threats.

However, our analysis addresses a less discussed aspect: WSJ as a practice through which science journalism negotiates its autonomy from science. Interviewees see science as socially constructed and deserving critical scrutiny. They contrast their work with science journalism that is subordinated to the scientific agenda and seek a more mature relationship with scientists as joint investigators on an equal footing. This translates into strategies to regulate their “closeness” to scientists and prevent anti-science uses of their critical stance.

Interviewees report effects on audience mobilization—contrary to the assumption that it is an esoteric subject—and on science governance, including regulations and resignations. This suggests that WSJ can contribute to systemic efforts to promote integrity and discourage bad scientific practices.

The variety of WSJ experiences documented across Ibero-America may signal a departure from the historically ingrained confusion between science journalism and science popularization in the region. It also suggests a degree of excellence rarely reported in the literature and calls for a reconsideration of Ibero-America's contribution to global science journalism.

We identify previously unreported challenges: political interference, even in democratic settings; physical and online threats and harassment; and practitioners' mental health strain. We also identify less discussed opportunities: multidisciplinary journalistic teams, regional collaboration networks, and the role of international specialized media and independent digital outlets as havens for WSJ, alongside some committed legacy media.

Some findings are likely specific to Ibero-America. However, they may offer useful ideas and strategies to researchers and professionals elsewhere, including in the Global North.

As a first-of-its-kind analysis of WSJ in Ibero-America, this study has clear limitations. Our sample of journalists is not statistically representative, nor does it cover all the countries of the region. The recurrence of topics in the interviews signals that we may have reached saturation, but we are certainly unable to grasp all the differences between countries in detail. The bulk of our analysis relies on the information's emitters. Future research may focus on a much more detailed study of WSJ products and on the perceptions of other stakeholders, such as scientists and audiences.

Our work yields some key recommendations for stakeholders to promote WSJ:

- For journalists: Applying strategies to manage their dependence on scientists (see Section 4.3) and to prevent anti-science use of WSJ (see Section 4.2), and seeking specialized training. The scarcity of educational opportunities in Latin America has been highlighted as a significant obstacle to science journalism (Massarani et al., 2022; Nguyen & Tran, 2019), and our interviewees have emphasized its importance. Key training subjects for WSJ are technical databases, data analysis, and requests for public information access.
- For journalism funders and donors: increasing support for independent outlets and networks of investigative science journalists, especially in Latin America. Nguyen and Tran (2019) already pointed out the scarcity of philanthropic funders in the Global South as a relevant hurdle, and our work confirms that this support is crucial for a part of WSJ. Funding targets may include training, legal and psychological support for journalists, and grants for WSJ projects (such as Retraction Watch, n.d.).
- For editors and media outlets: aligning practices to investigative journalism values and setting up routines that make time for it. Improving working conditions through more stable positions and better payment. Providing psychological support and legal protection by default to both staffers and freelancers.
- For the scientific community: increasing accountability and transparency practices. Recognizing the important role of WSJ in upholding integrity. Nguyen and Tran (2019) identified insufficient support and cooperation from the scientific community as a key problem for science journalism in the Global

South. Our work hints at a widely spread “code of silence” within the scientific community. Scientists should engage with journalists not only for self-promotion but as key sources for WSJ stories.

- For the administration and governments: making data more accessible by complying strictly with laws regulating access to public information.

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Michele Catanzaro has carried out work as a freelance journalist for *El Periódico de Catalunya* and *Science*, outlets for which two of the interviewees work.

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No LLMs were used for this article.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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Resilience as a Structural Condition: Mental Health and Safety Challenges in Watchdog Science Journalism

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Abstract

This article examines resilience and mental health as structural conditions shaping journalists' ability to perform a watchdog role in science-related domains. Based on 12 semi-structured interviews with Romanian investigative journalists, the study shows that watchdog science journalism operates in a fragile environment marked by institutional obstruction, financial precarity, harassment, and emotional strain. These pressures are particularly visible in investigations involving public health, environmental issues, and academic integrity, where journalists must deal with restricted access to information, expert authority, and public hostility. Participants describe burnout, anxiety, moral distress, and difficulties in sustaining long-term investigations without institutional support. Although they rely on coping strategies such as therapy, peer support, digital security practices, and professional networks, these mechanisms offer only partial protection. The article argues that resilience should not be understood only as an individual capacity, but as a structural requirement for sustaining watchdog science journalism. Understanding the conditions that undermine journalists' mental health, safety, and autonomy is essential for assessing the democratic value of their watchdog function.

Keywords

harassment; investigative journalism; mental health; resilience; structural vulnerability; watchdog science journalism

1. Introduction

In recent years, Romanian journalists, particularly in independent media, have increasingly investigated issues involving scientific expertise, including public health, environmental issues, and academic integrity. Journalistic investigations into plagiarism among political and institutional elites have exposed weaknesses

in academic integrity within the Romanian science system (Abbott, 2012) and have become a prominent area of investigative journalism in Romania. One of the cases that brought significant international attention to these issues was the plagiarism scandal involving Romanian Prime Minister Victor Ponta, which was investigated and publicly exposed by journalists and reported by *Nature* in 2012 (Schiermeier, 2012). More broadly, the issue of plagiarized doctoral theses among political elites has since been widely documented in national and international media (Gross, 2024; Lloyd, 2022; Lupu, 2024; Popoveniuc, 2025; “Romanian education minister resigns,” 2022; Stipiuc, 2024). Beyond academic integrity, investigative journalism has increasingly expanded to other domains where scientific expertise intersects with public accountability. The Covid-19 pandemic highlighted the challenges of communicating reliable scientific information in a polarized informational environment (Hart et al., 2020; Mureșan et al., 2021; Mureșan & Sălcudean, 2023; Sălcudean, 2022; Stănescu, 2020). During the pandemic, misinformation about vaccines and medical treatments circulated widely and was associated with vaccine hesitancy and growing distrust in experts and public institutions (Dascălu et al., 2021; Nistor, 2021; Stein, Omata, & Broker, 2021; Stein, Omata, Pachtman Shetty, et al., 2021). At the same time, the crisis exposed and intensified structural limitations in science-related reporting. Environmental controversies have similarly drawn increased media attention in Romania, particularly in relation to sustainability, conservation, and environmental reporting (Sălcudean, 2021; Sălcudean et al., 2024). These are just some examples that illustrate a broader area of journalistic practice focused on questioning institutions and actors operating in science-related fields.

In Romania, there are no media outlets dedicated specifically to watchdog science journalism. Science-related topics are typically covered by investigative journalists working on health, education, environmental issues, or public policy. Specialized science journalism remains limited. In this context, watchdog science journalism tends to emerge when science-related issues become part of broader investigative reporting rather than as a distinct professional specialization. In this article, watchdog science journalism refers to investigative reporting that examines actors and institutions operating in domains where scientific expertise plays a central role. In Romania, investigative journalism has developed as an important watchdog practice, although its capacity has been shaped by economic and institutional constraints (Petre & Jacotă, 2021; Stetka & Örnebring, 2013). In the absence of specialized science journalism, science-related watchdog reporting is often carried out by investigative journalists. Romania’s media landscape includes both traditional media institutions and a growing sector of independent outlets. Investigative journalism operates within a fragmented and relatively small professional ecosystem. Independent media outlets such as *Recorder*, *Snoop*, *Context*, *PressOne*, *Public Record*, *Info Sud-Est*, and *Átlátszó Erdély*, a Hungarian-language investigative outlet, often work with small teams on complex investigations. More broadly, the Romanian investigative media ecosystem is marked by financial fragility, a politically sensitive environment, limited institutional support, and reliance on project-based funding.

Similar dynamics have been documented in several Central and Eastern European media systems where fragile institutional environments limit the capacity of journalism to fully perform its watchdog role (Gerli et al., 2018). These challenges become particularly significant in the context of watchdog science journalism, where journalists investigate actors and institutions that possess significant epistemic authority, including universities, research institutes, public health agencies, and environmental authorities. International literature shows that reporting in science-related domains involves asymmetries of expertise, technical complexity, dependence on expert interpretation, and institutional barriers to accessing scientific information (Goodell, 1979, 1987; Peters, 2022). Recent studies distinguish between science journalism and

watchdog science journalism, arguing that the latter plays a crucial role in public accountability (Nguyen, 2024). Broader scholarship also highlights the epistemic demands of science-related reporting (Fleerackers et al., 2024). For this reason, this article focuses on investigative journalists who engage with science-related topics, rather than on specialized science journalists.

Research on investigative journalism in science-related domains remains limited, as most studies do not address the specific challenges of reporting on science. This gap is important because these challenges affect not only working conditions, but also the sustainability of watchdog journalism in areas where scientific expertise has significant societal consequences. Studies on journalists' mental health indicate high levels of burnout, anxiety, and exposure to trauma, particularly among investigative reporters and journalists covering crises (de Jong & Kotišová, 2025; Newman et al., 2022; Reinardy et al., 2021; "Training for journalists," 2025). Understanding the conditions under which journalists operate is therefore essential not only for assessing individual well-being, but also for understanding how these conditions affect informed public debate. This study examines how resilience, mental health, and professional safety function as structural conditions shaping watchdog science journalism. Based on semi-structured interviews with Romanian investigative journalists who have reported on topics such as public health, environmental issues, and academic integrity, the study addresses the following research questions:

1. How do investigative journalists evaluate and describe their working conditions when reporting on science-related topics?
2. How do these conditions affect journalists' mental health and their ability to perform a watchdog role?
3. What individual and collective coping mechanisms do journalists use in this context?

2. Theoretical Framework

2.1. Watchdog Science Journalism

Scholars have devoted significant attention to the roles journalists perform in democratic societies (Hanitzsch & Vos, 2018; Mellado & Lagos, 2014; Wang & Li, 2024). Among these, the watchdog role is widely seen as a core function. It involves monitoring those in power and exposing abuses or institutional failures to ensure public accountability (Miller, 2006; Waisbord, 2002). In studies of journalistic role performance, it is typically contrasted with the loyal-facilitator role, although studies show that these roles often coexist in practice (Mellado & Lagos, 2014; Wang & Li, 2024). Recent research also suggests that the performance of watchdog journalism depends less on levels of press freedom than on organizational and professional conditions (Hamada & Abdel-Salam, 2025).

In practice, the watchdog role is most often enacted through investigative reporting, which focuses on uncovering wrongdoing and holding institutions accountable (de Burgh, 2008; Ettema & Glasser, 1998). Although some studies indicate a decline in watchdog functions during the pandemic (Hallin et al., 2023; Hart et al., 2020), investigative journalism continues to perform this role in domains involving scientific expertise.

Science journalism is commonly defined as the mediation of scientific knowledge for the public (Secko et al., 2013), but it can also involve scrutinizing how scientific institutions operate. Watchdog science journalism

refers to investigative reporting in domains where scientific authority plays a central role, such as public health, environmental governance, or academia (Nguyen, 2024). This form of journalism requires engaging with specialized knowledge, interpreting complex data, and evaluating competing claims, often under conditions of epistemic asymmetry (Fleerackers et al., 2024; Peters, 2022). The Covid-19 pandemic further highlighted this function, as journalists were required not only to communicate scientific information but also to verify medical claims and challenge misinformation (Hart et al., 2020).

2.2. Structural Constraints, Risk, and Resilience

Research on science and investigative journalism highlights several constraints that affect journalists' ability to perform watchdog reporting. Because institutions play a central role in mediating access to science-related information (Peters, 2022), restrictions in transparency can become a significant obstacle for watchdog reporting. Access to official information may be slow or obstructed, while freedom-of-information legislation is not always applied consistently. Science-related fields are also shaped by political and economic interests, which can generate additional pressure on journalists investigating institutional failures or conflicts of interest (Waisbord, 2002).

These dynamics can be understood within a broader science communication ecosystem, in which journalists, scientists, policymakers, and media organizations interact under conditions shaped by institutional transparency, power relations, and resource distribution (Fischer et al., 2025). In the Romanian context, these pressures are intensified by the fragmentation of the media system, the financial fragility of independent outlets, and sometimes limited institutional support for investigative journalism, particularly in science-related domains.

These structural constraints are accompanied by growing levels of harassment and professional risk. International organizations document increasing levels of online hostility, coordinated attacks, and strategic lawsuits targeting investigative journalists, particularly when reporting on polarized topics (International Press Institute, 2026; UNESCO, 2024). In this context, journalists' psychological strain can be understood as an outcome of systemic pressures operating within the broader science communication ecosystem. In science-related investigations, such pressures may be reinforced by the epistemic authority of institutions, which can limit access to information and shape interactions with sources.

The cumulative effects of these pressures can have significant psychological consequences. Journalists exposed to sustained professional stress may experience burnout, anxiety, or emotional exhaustion (Newman et al., 2022; Reinardy et al., 2021). Recent scholarship emphasizes that resilience in journalism should not be understood solely as an individual psychological capacity but also as a collective process shaped by organizational resources, professional networks, and institutional contexts (Herrera Damas & Valero-Pastor, 2026; Relly & Waisbord, 2022).

3. Data and Method

This study is based on 12 semi-structured interviews with Romanian investigative journalists who have reported on topics involving scientific expertise, including health, environment, education, and academic integrity. Participants work in independent local and national newsrooms, as well as generalist media

organizations, typically in small teams without dedicated science desks, where such investigations are integrated into broader reporting agendas. The sample includes journalists from different organizations and career stages (five women, seven men, aged 26–65). Some have experience in larger media organizations. All participants have backgrounds in journalism or related fields, and some reported additional training in science-related topics.

Participants were selected based on their investigative reporting experience in science-related areas. Relevant cases were identified through published investigations and the author's knowledge of the Romanian journalism field. Additional participants were identified through recommendations from journalists and other media professionals, resulting in a limited snowball component. Mental health was not a selection criterion. Interviews were conducted between September 2025 and February 2026, online or in person, and lasted approximately 90 minutes. All participants were anonymized (J1–J12) and required to sign an informed consent form prior to participation. The interview guide covered four areas: structural constraints, professional risk, psychological impact, and coping mechanisms. Interviews were open-ended, allowing participants to describe their experiences in detail. The sample size reflects the relatively small professional community of investigative journalists working on science-related topics in Romania and was sufficient to identify recurring themes relevant to the research questions. The full interview guide is included in the Supplementary File.

3.1. Data Analysis

The interview data were analyzed using reflexive thematic analysis (Braun & Clarke, 2006, 2021). The analysis was conducted by the author through an iterative process involving repeated reading of the transcripts and the identification of patterns relevant to the research questions. Coding was conducted manually and combined deductive and inductive approaches. Initial thematic areas were derived from the interview guide, while additional codes were developed from the data. The final analytical structure was organized around four thematic areas: structural constraints and institutional pressures; harassment and professional risk; psychological impact and mental health; and coping mechanisms and structural resilience.

4. Structural Constraints and Institutional Pressures

4.1. Barriers to Information and Expertise

Participants described a professional environment that was, at times, marked by administrative opacity, institutional pressure, and limited resources when investigating science-related topics. Although some variation emerged across reporting contexts and organizational settings, no consistent differences were identified across participants' accounts. A recurring theme across the interviews was restricted access to public information, particularly in relation to health and other science-related fields. Journalists reported repeated experiences in which institutions ignored formal requests, delayed responses, or provided incomplete data, even in situations regulated by law. One participant described repeated difficulties in accessing public-interest information, noting that legal action was sometimes necessary to obtain essential data. As J4 put it, "Even basic information, such as fire safety in hospitals, is difficult to obtain. After the pandemic, this tendency toward secrecy has become even stronger."

Several participants described legal action as a strategy sometimes used to obtain public-interest information in science-related fields such as healthcare. J1 noted that institutions sometimes stopped responding once an investigation was about to be published, while J12 emphasized that access-to-information rights were often restricted in practice. Participants also pointed out that limited time, resources, and legal support could prevent journalists from pursuing formal complaints. Similar difficulties were reported in relation to academic and research institutions, including unanswered requests, refusals to provide data, and the use of data protection arguments to limit disclosure. J2 described a case in which multiple newsrooms submitted the same request to a university without receiving a response. Taken together, these experiences point to forms of institutional opacity that may constrain the watchdog role of journalism.

These constraints were particularly visible in participants' accounts, especially during the Covid-19 pandemic, when journalists described covering complex medical issues while struggling to obtain verified information. Some participants reported difficulties accessing hospitals, reflecting asymmetries of expertise between journalists and scientific actors. Similar challenges were described in education, environmental reporting, and local administration, including inconsistent data and prolonged legal disputes. In response, journalists described relying on informal networks, whistleblowers, and alternative sources when official channels proved insufficient. As J4 suggested, identifying individuals with relevant internal knowledge sometimes became necessary. Science reporting also requires translating technical complexity and building trust with experts, which participants described as particularly challenging in the absence of prior relationships.

Some participants reported difficulties finding experts willing to speak on record, particularly when investigations involved sensitive topics. J5 described the difficulty of working on environmental issues where reliable public data were scarce. Participants also pointed out that, even when experts were available, their perspectives could reflect institutional or professional interests, which made verification more difficult. As J7 noted:

You have to be careful how you choose your experts. When dealing with medical literature, before publishing a story after speaking with a doctor, I still go back and verify the terminology and the information, even if I have the recording.

4.2. Institutional Pressure and Structural Politicization

The above-referenced institutional opacity was closely tied, in participants' accounts, to another structural issue: the perceived politicization and centralization of public institutions. Interviewees, particularly those reporting on healthcare and public policy, described systems in which important decisions were often made by politically appointed actors. This, in their view, contributed to information asymmetries and shaped journalists' interactions with institutions. Participants also suggested that the authority associated with scientific and public institutions could make decision-making processes less transparent and more difficult to scrutinize:

Highly centralized decisions are usually made by politically appointed individuals....Politicization is in the DNA of the system....It has not undergone any major reform for more than 50 years. (J10)

Participants also highlighted the importance of whistleblowers in investigations involving the healthcare system. According to J7, potential sources are often members of professional communities such as doctors, pharmacists, or researchers who remain motivated by professional ideals despite working within demanding and politically influenced institutional environments. This highlights the need to access specialized knowledge and navigate asymmetries of expertise that are characteristic of watchdog science journalism. Journalists maintained they often had to map institutional power structures and identify the actors, interests, and decision-making chains involved in complex policy areas. Investigations addressing sensitive topics—such as public health policies, environmental governance, or the use of European funds—could trigger defensive responses from institutions. In these contexts, the combination of institutional pressure and scientific complexity made verification more difficult and increased the risks associated with challenging official narratives. Journalists described situations in which local authorities refused dialogue, avoided requests for information, or adopted antagonistic attitudes towards the press. Some participants also described more indirect forms of institutional pressure, including tax investigations initiated shortly after the publication of sensitive reporting (J4).

Participants also referred to recent episodes illustrating the broader vulnerability of watchdog journalism in Romania, including the widely reported targeting of journalist Emilia Șercan (Dixon, 2022; Șercan, 2022) and legislative changes affecting plagiarism oversight (Costiniuc, 2018). These accounts suggest that institutional pressure can shape both access to information and journalists' ability to sustain watchdog reporting in domains where scientific expertise meets public accountability.

4.3. Financial Precarity and Structural Constraints in Newsrooms

Regardless of the institutions they investigate, many participants pointed to the financial fragility of newsrooms as a structural issue affecting the ability to conduct complex investigations in domains involving scientific knowledge. Although exceptions do exist, they remain relatively rare within the Romanian media landscape, where many investigative outlets operate under significant financial constraints. Another aspect raised by participants concerned the availability of political funding for parts of the Romanian media system, which some journalists perceived as a source of professional vulnerability. J2 highlights the dilemmas created by funding derived from public money allocated to political parties:

There are also money-related dilemmas, in the sense that there are publications who accept funds from political parties and say it's fine. I don't agree with that...you leave a lot of room for your publication to be attacked.

J2 further explains the symmetrical risk of political attacks when media outlets depend on funding from a political party:

If I take money from the Social Democratic Party...the National Liberal Party might attack me when I write about the National Liberal Party, and vice versa. It's a very grey area, which is somehow allowed by legislation.

Participants also described pressure from audience members who financially support certain publications. J12 mentioned reactions from supporters following investigations targeting political actors: "We paid you

and now we won't give you another cent"; "I cancelled my subscription to you." J2 described these funding models as a source of professional vulnerability: "It's very clear that legislation allows money from political parties, which is public money, to reach the press." In contrast, several participants described editorial grants, reader donations, and direct public support as preferable alternatives for independent journalism, while also acknowledging their limitations. As J12 noted, "We believe that one of the solutions is to move toward grants and reader donations. Although even this can sometimes come back as backlash."

J5 described the financial pressures affecting watchdog science journalism:

These international grants are disappearing....We are in a situation where we no longer have the guarantee that we can pay journalists' salaries.

In smaller newsrooms, limited resources translate into reduced time for documentation, a lack of funds for travel or expert consultation, as well as the need for journalists to perform multiple roles simultaneously. Financial precarity also affects journalists' ability to focus exclusively on investigative work. Participants described the constant need to secure funding, write grant applications, and organize fundraising campaigns while simultaneously conducting investigations. One journalist explained that financial concerns remained a constant background pressure in everyday work:

When I work as a journalist, I'm always thinking about budgets, grant applications, fundraising campaigns—everything related to money. I've never had the luxury of focusing 100% on the story I'm working on, because I have this constant thought in the background: money, money, money. (J5)

J11 summarizes this constraint: "The problem is resources...you need time, money, and access." J1 also mentions the lack of resources needed to develop environmental investigations alongside major political stories, which can become professionally frustrating—another consequence of structural financial precarity. J12 additionally refers to the importance of the Romanian 3.5% tax redirection mechanism, which allows taxpayers to allocate 3.5% of their income tax to non-profit organizations, including NGO-based media outlets, while emphasizing the political vulnerability of this funding pillar: "We are convinced that politicians cannot wait to abolish it." For some journalists, grants function primarily as a means of diversification rather than survival: "We apply for grants mainly to diversify our sources of income...in case one of our funding pillars disappears" (J12). Financial precarity operates not merely as an economic constraint, but also as a structural condition shaping the sustainability of watchdog science journalism.

5. Harassment, Attacks, and Professional Risk

Harassment and professional risk emerged as recurring themes in interviews with journalists investigating sensitive topics, including corruption involving public health, or other science-related institutions. Although not all participants reported direct harassment, their accounts point to a broader sense of professional vulnerability when confronting actors with significant political, economic, or institutional power. These risks can be intensified by the authority of the institutions involved and the sensitivity of the topics under scrutiny. For some participants, vulnerability also emerged through everyday field interactions, particularly in reporting on sensitive health issues or local institutional matters. Journalists described hostile encounters, refusals to cooperate, and tense conversations with institutional actors, especially during medical crises

or politically sensitive investigations. These situations did not always involve explicit threats, but they contributed to a broader sense of professional vulnerability. In science-related investigations, such conditions can restrict access to expert sources, complicate verification, and make sensitive reporting more difficult.

Newsroom fragmentation also emerged as a structural vulnerability. As J3 explained, “The fragmentation of the press is a reflection of what we are experiencing now...we are no longer part of a team, we no longer have a mentor or a protector.” Participants reported several forms of intimidation. One of the clearest examples involved physical risks encountered during investigations. J2 described instances where journalists were being followed during fieldwork, as well as a situation where a newsroom car was vandalized during a health investigation. Such episodes illustrate that physical risk remains present. Legal pressure is another significant form of intimidation. J1 described receiving legal threats after publishing an environmental investigation: “They sent an entire file to the newsroom threatening to sue me....I received notifications claiming that I was lying in the article....A city hall sued me.” These situations resemble dynamics commonly associated with SLAPP lawsuits (Strategic Lawsuits Against Public Participation), which are often used to intimidate journalists and drain newsroom resources (Kerševan & Poler, 2024; Ross, 2026). Preparing a legal defense can require several weeks of work and legal costs, which may significantly affect small investigative newsrooms. In the absence of anti-SLAPP protections, journalists remain vulnerable to disproportionate legal pressure—a topic also documented in Romania by media monitoring organizations such as Media Freedom Rapid Response (2026). Some participants described relying on external legal protection mechanisms to mitigate such risks. J4 mentioned joining the international initiative Reporters’ Shield, a subscription-based service that provides financial and legal assistance in defamation cases. These mechanisms are particularly important for smaller newsrooms that lack the resources to retain legal counsel independently.

Beyond lawsuits, some participants described other forms of institutional pressure following the publication of investigations. Even when pressure did not take the form of lawsuits or explicit threats, participants described a persistent climate of institutional tension that could discourage cooperation and limit access to expert sources.

5.1. Online Harassment

Participants also described negative reactions, public pressure, and, in some cases, targeted criticism following the publication of investigative materials. J11 referred to pressure exerted by audiences after publishing a controversial interview on a health topic: “People really want their current beliefs to be confirmed.” This reflects the tensions surrounding highly polarized topics, particularly those involving scientific issues such as vaccines, unvalidated treatments, or pandemic-related reporting. In these contexts, journalists must navigate not only institutional constraints but also competing knowledge claims and strong pre-existing public beliefs. Some participants also reported hostile responses from members of the scientific community. Although these reactions did not always take the shape of direct intimidation, they sometimes involved dismissive or aggressive comments directed at journalists’ work, particularly on social media platforms. One participant described such interactions as occasionally becoming confrontational:

We do receive reactions from the scientific community—from researchers—and sometimes these reactions are quite toxic. We get Facebook comments saying things like: “What you did is nonsense; it’s not like that—I know better.” (J5)

These interactions reflect tensions between journalistic and scientific forms of authority, where expertise is contested and journalists' interpretations may be challenged by actors claiming superior knowledge. Online reactions and public pressure can become an additional source of vulnerability for journalists covering scientific or health-related topics, where debates are often shaped by strong pre-existing beliefs.

5.2. Personal Safety

Although not all participants reported explicit harassment, even those who had not been directly intimidated described precautionary practices as part of their professional routine. These included avoiding certain paths or locations, communicating cautiously with sources, limiting personal exposure, adopting protective practices when handling sensitive sources, and monitoring daily routines to detect potential surveillance. These practices indicate that risk management has become embedded in everyday journalistic routines, reflecting the normalization of precautionary behavior in investigative reporting environments. Even when harassment is not explicit, journalists describe a professional environment in which precaution, risk assessment, and defensive strategies become part of everyday practice. Such conditions contribute to a broader climate of professional vulnerability, which, in turn, has implications for journalists' psychological well-being and their capacity to sustain long-term investigative work in science-related domains.

J2 explains how journalists adjust their behavior to mitigate potential risks while conducting investigations: "You never go alone on the field....You evaluate the risks."

6. Psychological Impact and Mental Health

The interviews show that watchdog journalism in areas involving scientific expertise carries a significant emotional burden. This psychological impact is closely linked to the structural conditions described in previous sections, including institutional opacity, financial precarity, and professional risk. Participants describe a constant state of pressure characterized by anxiety, exhaustion, cognitive overload, and moral stress. This psychological impact stems not only from harassment and institutional hostility, but also from the responsibility of communicating accurate information in sensitive and often polarized contexts. J3 speaks openly about chronic anxiety: "I've been in therapy for 10 years, because of anxiety....After I finish an investigation, there is a kind of post-partum anxiety....The worst thing for me is when my private life is attacked." For some participants, the pressure affected sleep. As one journalist recalled, "I couldn't even sleep because I kept thinking something had happened and I had missed it" (J8). At the same time, J3 emphasizes that mental health remains an under-discussed issue within the profession: "Journalists' mental health is a taboo topic...but it is crucial." These reflections illustrate how sustained professional pressures may translate into long-term psychological strain for journalists who report on science topics.

Some journalists work on topics that involve direct exposure to dramatic situations, including hospital scenes, tragedies, or severe social problems. Such experiences suggest that reporting on medical crises involves not only gathering information but also confronting human suffering, which may leave lasting emotional scars. J9 described the same experiences while reporting from hospitals, indicating that repeated exposure to distressing situations can generate significant emotional strain. Several participants also refer to the epistemic responsibility associated with reporting on complex scientific issues: "We also make mistakes, but we are accountable for them" (J11). Journalists describe anxiety related to verifying data, the possibility

of being challenged publicly, and the consequences of publishing sensitive investigations in highly polarized informational environments. Medical and health reporting was described as requiring both rigorous verification and emotional resilience. As J9 noted, beyond documentation, “you also need nerves,” especially when covering high-impact situations. Exhaustion was described as resulting from several interconnected factors: the fast pace of investigative work, small newsroom teams, institutional pressure, limited resources, and the moral responsibility associated with covering sensitive issues. When reporting on science, this burden can be intensified by the need for prolonged verification processes and engagement with specialized expertise. Long investigations may further increase this strain, as legal procedures and access-to-information requests can take years to resolve. As J5 explains:

The idea is not to expect immediate results, because nothing happens in the short term. You need the resilience to continue working over the long run...sometimes a process like this can take three, four, even five years before you obtain something.

Work overload also contributes to psychological pressure. As J1 notes, “It’s not normal for us to work on three or four topics simultaneously, but sometimes that’s what we do.” J11 describes emotional saturation after covering pandemic-related stories, including persistent fatigue and limited recovery time between assignments. Despite these pressures, participants report limited institutional support. Emotional consequences of investigative journalism are often managed individually rather than through formal newsroom mechanisms. Journalists describe difficulties discussing investigations with family members, who do not always understand the nature of their work, the absence of institutional counselling structures, and the tendency to internalize professional stress. Some participants therefore argue that psychological counselling should become a routine component of journalistic work, particularly in professions exposed to sustained pressure. As J5 explains:

Just as construction workers need helmets and protective boots, journalists working under intense psychological pressure should have access to counselling and therapy.

Although occasional training sessions addressing burnout or mental health exist, participants consider them insufficient compared to the scale of the problem. Only one participant (J5) reported working in a newsroom that provides psychological counselling and applies structured support practices. Participants said that media managers sometimes perceive journalists’ mental health as an organizational vulnerability, making newsrooms reluctant to address it. As J3 noted, “It doesn’t cost much, but it’s an investment that can save a life—or completely change someone.”

7. Coping Mechanisms and the Need for Structural Resilience

Journalists described both general coping strategies and practices specific to investigative journalism. While some strategies relate to managing stress more broadly, others are directly connected to the demands of watchdog journalism. The interviews show that journalists rely on a combination of personal, professional, and collective strategies to cope with the pressures associated with their work. However, resilience mechanisms remain predominantly individual, while institutional support is described as rare or limited. Participants repeatedly emphasize that emotional, psychological, and operational safety depends largely on personal resources and solidarity among colleagues. One of the most frequently mentioned coping

mechanisms is rigorous fact-checking. In this context, verification practices are not only a professional norm but also a coping mechanism specific to watchdog journalism, as they reduce uncertainty and potential legal risk. As J1 explains, “The best solution for these feelings of anxiety is to fact-check everything thoroughly....If you don’t have evidence for a sentence, you remove it from the text. When you are sued, you know you did your job properly.” In this way, verification practices become a key component of watchdog science journalism, as they contribute to reducing professional anxiety.

Participants also describe individual coping strategies aimed at maintaining emotional balance. Some participants emphasized the role of physical activity in coping with stress, noting that “yoga, sports, long walks, volleyball, and training” help them manage pressure. J12, for example, explains, “I prefer to say that I’m addicted to going to the gym or running.” Others mention the importance of mental breaks between demanding investigations. Some journalists describe activities requiring intense concentration to disconnect from professional pressure. For J2, riding a motorcycle functions as a form of embodied focus: “When you ride a motorcycle, you cannot really think about anything else. You must be fully focused on driving, on the motorcycle, on your body.” Some participants described reconnecting with nature as a coping mechanism. As J6 noted, moving out of the city and experiencing a quieter, less polluted environment helped them “breathe well again.”

Beyond individual coping strategies, professional solidarity emerges as an important form of collective resilience. Journalists describe relying on colleagues for editorial feedback, source sharing, and ethical discussions during investigations. Working in teams also helps reduce safety risks during field reporting. These forms of collaboration are particularly important in watchdog science journalism, where investigations often require the sharing of expertise and verification of complex information. International investigative networks are another important source of support. Several journalists also mentioned initiatives organized by NGOs as useful forms of support:

We were 13 journalists, a therapist came, and we did some exercises. We all started talking and began to realize that we are similar. The meeting lasted for three and a half hours, it was something extraordinary. The therapist was telling us some basic things, and we recognized ourselves in them. (J3)

Participants mention collaborations with organizations such as the Organized Crime and Corruption Reporting Project (OCCRP), which provide access to professional networks, investigative databases, and psychological support. As J6 explains, “OCCRP works with a network of European therapists; the first 10 sessions are pro bono.” Such transnational infrastructures offer resources that are often unavailable within local newsroom environments. Overall, the interviews suggest that resilience in watchdog science journalism is largely sustained through informal professional networks and individual coping strategies rather than institutional support structures. While journalists develop various mechanisms to manage pressure—including rigorous verification, professional collaboration, and personal routines—participants repeatedly emphasize the need for stronger structural protection, including legal safeguards, psychological support, and clearer professional recognition.

7.1. The Absence of Institutional Resilience Infrastructure

A recurring theme across the interviews was the absence of formal mechanisms to support journalists facing professional pressure. Participants mentioned limited access to psychological counselling, legal support, and professional training, often relying instead on self-learning or improvisation. Journalists also pointed to the absence of a clearer professional framework for journalism. J11 argued that the lack of clear standards creates ambiguity around professional roles and weakens institutional protection: “There is a need to regulate the status of journalists....At the moment, if you ask anyone...they won’t be able to tell you what a journalist is.” Participants suggested that this institutional uncertainty may also undermine professional credibility and complicate interactions with public institutions.

This is particularly relevant in watchdog science journalism, where investigations require sustained engagement with complex expertise and long reporting processes. Participants also highlighted the role of public perceptions. While some audiences recognize the effort involved in investigative reporting on science topics, others interpret it through conspiratorial narratives or political bias. Such perceptions add to professional and psychological pressure and point to the need for stronger media literacy.

This institutional ambiguity reinforces the idea that resilience cannot be understood solely at an individual level. As J3 states, “Journalists’ mental health...influences the entire evolution of the free press.” Across the interviews, resilience appeared to rely largely on informal practices. Journalists relied on peer support, teamwork, and precautionary practices rather than on institutional protection. As J2 notes, “There are risks. But we protect each other.” While these strategies help manage pressure, participants emphasize that structural support—legal protection, stable funding, access to expertise, and psychological services—remains limited.

Interviewees also describe moments of professional doubt, especially when certain topics, such as environmental reporting, are marginalized in favor of more visible political issues. As J1 explains, “In the past months I’ve had serious doubts about myself and my place in journalism....Working in a very small newsroom, topics tend to be prioritized...environmental topics are not considered as important as political ones.”

8. Discussion

The findings suggest that resilience in watchdog science journalism is not only an individual capacity. Instead, it is shaped by institutional, economic, and political conditions. These conditions appear to affect journalists’ ability to perform a watchdog role in domains where scientific expertise has significant societal consequences. In Romania, investigative journalists working on science-related topics operate in a context marked by restricted access to information, institutional opacity and pressure, and financial precarity. While these challenges are not unique to this field, science-related reporting adds further complexity. Unlike other forms of investigative journalism, watchdog science journalism often requires sustained engagement with specialized expertise and the interpretation of complex technical information (Nguyen, 2024; Peters, 2022). Verification may depend not only on documentary evidence and sources, but also on the ability to assess competing expert claims and navigate institutional forms of scientific authority. A recurring issue across interviews concerns limited access to public information. Participants described delayed or ignored requests and incomplete data, pointing to forms of institutional opacity that may undermine the practical

implementation of transparency legislation. Journalists described cases in which litigation became necessary to obtain information. Legal pressure represented another constraint, with journalists reporting lawsuits, threats, and other forms of pressure that could delay or disrupt ongoing work. These findings align with recent Romanian research showing that verbal and psychological harassment remain common professional risks for journalists (Vasilendiuc et al., 2026). At the same time, fragile funding models and dependence on grants shape which investigations can be pursued and sustained. The study also highlights the epistemic demands of science-related reporting. This reflects broader scholarship showing that science reporting involves technical complexity and clear asymmetries of expertise (Fleerackers et al., 2024; Goodell, 1987; Peters, 2022). Challenging actors whose authority is grounded in scientific knowledge can be particularly difficult. Journalists reporting on science topics must translate complex information while evaluating competing expert claims, often without specialized training or institutional support. This aligns with research showing elevated burnout, emotional exhaustion, and mental health strain among journalists working under sustained pressure, particularly in crisis and investigative contexts (Newman et al., 2022; Reinardy et al., 2021; “Training for journalists,” 2025).

Participants reported that these challenges were particularly pronounced, especially when reporting on sensitive issues such as public health. This strain is closely linked to working conditions: Institutional hostility, financial instability, and public pressure contribute to a professional environment in which stress becomes routine. While journalists rely on individual coping strategies (therapy, physical exercise, or peer support), these offer only partial protection. Participants emphasized that broader institutional support mattered more. This supports scholarship that frames resilience not simply as an individual trait, but as a condition shaped by organizational and structural contexts (Herrera Damas & Valero-Pastor, 2026; Newman et al., 2022; Relly & Waisbord, 2022). Sustaining watchdog science journalism depends on access to legal protection, stable funding, reliable access to information, professional training, and psychological support within newsrooms.

9. Limitations and Future Research

This study has several limitations. Firstly, the study is based on a relatively small sample size and focuses on a single national context. The results should be interpreted as context-specific rather than broadly representative of watchdog science journalism in other media systems. Secondly, the study relies on self-reported data, which may be influenced by participants’ perceptions. Thirdly, in the absence of specialized science journalism, the sample includes only investigative journalists working on complex, high-risk topics, which may emphasize higher levels of pressure and vulnerability. Future research could explore how different professional backgrounds shape reporting practices in science-related domains. Comparative studies across different media systems could further examine how structural conditions shape journalists’ capacity to perform a watchdog role in science-related domains, while also investigating variations between beats such as health, environment, and academia. In addition, further research could analyze the role of professional training, newsroom cultures, transnational collaborations, and institutional support mechanisms in strengthening structural resilience in watchdog science journalism.

10. Conclusion

This study provides qualitative evidence on the working conditions of investigative journalists covering science-related topics in Romania, with a specific focus on watchdog science journalism. In the Romanian

context, this remains an underexplored area, particularly in relation to resilience, mental health, professional safety, and the conditions required to sustain this type of reporting. The findings show that resilience in watchdog science journalism should not be understood only as an individual capacity, but also as something shaped by newsroom resources, legal protections, institutional transparency, access to expertise, and professional support (Herrera Damas & Valero-Pastor, 2026; Relly & Waisbord, 2022). These issues are increasingly relevant in a media environment marked by political pressure, economic instability, public hostility, and growing informational complexity (Newman et al., 2022; UNESCO, 2024). By focusing on watchdog reporting in domains where scientific expertise plays a central role, the study also raises broader questions about the sustainability of investigative journalism as a profession. Strengthening watchdog science journalism requires not only individual coping strategies, but also legal protection, psychological support, professional safety training, and stronger professional support networks.

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Conflict of Interests

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Data Availability

The data are not publicly available due to confidentiality agreements with the participants.

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Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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Conflicts of Interest Between Systemic and Corruptive: A Conceptual Compass for Watchdog Science Journalists

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Abstract

Watchdog science journalism is essential to scrutinise the structural and financial conditions of scientific research. As a crucial part of this system, experts play a pivotal role in shaping knowledge, guiding policy, and influencing societal decisions. Their credibility is embedded in a complex web of relationships that brings about different conflicts of interest (COIs). Yet, journalists’ ability to uncover entanglements and ensure accountability is limited by often incomplete disclosure and conceptual vagueness of what exactly constitutes a COI. Using (bio-)medical research as an example, we develop a multidimensional typology of COIs, based on an extensive review of academic literature and disclosure frameworks in science, practice, and policy-making. To our knowledge, this is the most comprehensive mapping of structural, social, and material factors in a single overview to date. While not all these interdependencies are inherently problematic for a functioning research system, they still require journalists to navigate them and carefully evaluate their significance. To facilitate this, the framework also serves as both a matrix and a corrective for potential AI-based systems detecting COIs. Even though transparency and critique are central to watchdog science journalism, journalists should also be careful not to undermine public trust in science generally. Conflicts have to be evaluated carefully but without portraying science funding as inherently corrupt—thus feeding narratives of science-related populism. By foregrounding the systemic nature of COIs, this perspective supports reflection on professional norms, strategies, and principled decision-making in investigative reporting—also regarding journalism’s own entanglements with individual and third-party interests.

Keywords

conflicts of interest; expert credibility; funding transparency; science journalism; watchdog journalism

1. Introduction

Watchdog science journalism, which monitors, investigates, and reports on research infractions, their impacts, and causes (Franks et al., 2023), plays a crucial role in scrutinising scientific research for the public, the scientific community, and regulatory bodies. Its scope ranges from the exposure of questionable scientific methods, uncovering funding-related conflicts and research fraud, to exposing ethics breaches and predatory publishing that compromise research integrity and public trust in the scientific system (Fleerackers et al., 2026; Franks et al., 2023; Nature, 2009). In this respect, science journalism follows the theoretical framework of journalism in general as a critical mechanism for ascertaining truth (Barnhurst & Owens, 2012). Its accountability function is particularly vital in (bio-)medical research, where scientific knowledge directly affects clinical practice, health policy, and public understanding of diseases. Additionally, researchers and physicians play a central role in reporting on health topics. Their statements carry weight; they can not only influence individual treatment decisions but also shape the public perception of science and steer political debates (Entwistle & Hancock-Beaulieu, 1992; Serong et al., 2019). This function of journalism becomes even more important in the face of increasing digital disinformation. Critical reporting without legitimising narratives of “science-related populism” (Mede & Schäfer, 2020) that portrays organised scientific “elites” as corrupt and untrustworthy becomes a key challenge.

However, (bio-)medical practice and research operate within a network of science, industry, healthcare, and policy, with individuals and institutions regularly collaborating with pharmaceutical, medical device, and biotechnology product manufacturers (Chimonas et al., 2021). Between 2013 and 2022 alone, the medical device and pharmaceutical industry paid \$12.13 billion to over 826,000 physicians in the US (Sayed et al., 2024). Substantial and often undisclosed industry payments to institutions and researchers who author guidelines, advise on drug policy, and shape treatment standards have been frequently reported across multiple health industry areas (e.g., Boytchev, 2023).

These connections are not necessarily problematic in every case. In fact, they often drive research and innovation. The pharmaceutical industry, e.g., funds a majority of drug development, with estimated total costs ranging from \$43.4 million to \$4.2 billion per drug (Moon et al., 2022). Around half of these costs accrue during clinical development, borne largely by the pharmaceutical industry (Simoens & Huys, 2021; Zhou et al., 2023).

However, these connections increase the risk of influence on professional judgment, research outcomes, and policy recommendations—whether conscious or unconscious—and therefore pose a conflict of interest (COI; Chimonas et al., 2021; Thompson, 1993). A variety of studies show that even modest incentives, such as sponsored meals or small gifts, can shift physicians’ prescribing patterns (e.g., Mitchell et al., 2021; Newham & Valente, 2024). Similarly, industry-funded clinical research tends to yield favourably interpreted results for the sponsor (Lundh et al., 2017; Siena et al., 2023).

To fulfil their watchdog role, science journalists must therefore monitor, investigate, and report on such connections. Most journalists working for quality media are used to keeping the possible financial or political COIs of their sources in mind. For example, the Science Media Center Germany (www.sciencemediacenter.de/en) requires COI disclaimers from experts cited. The need for “asking about, weighing and disclosing relevant financial, advocacy, personal or other interests of those [they] interview as

a routine part of story research and interviews” is also mentioned in a checklist for good medical journalistic practice (Schwitzer, 2008, p. 701). Such standards are often applied in journalism education as well. However, a detailed explanation of the broader spectrum of possible COIs as developed here seems to be missing in current journalism training manuals.

Journalistic responsibility begins with the selection of the sources that media features since “the people who are given the right to speak, are afforded the power and privilege to frame the narrative” (Scherling & Foltz, 2024, p. 164). As they are essential context for evaluating experts’ positions in public discourse, journalists who fail to scrutinise COIs may “wittingly or unwittingly” become “megaphones for biased experts, industry and lobby groups” (Levi, 2001, xiii).

However, their means to uncover these entanglements are limited. While in the US the “Sunshine Act” provides legal requirements to disclose at least some financial connections between prescribing clinicians and industry, many European countries lack regulation. Disclosure to the general public often remains voluntary—and tends to be incomplete, inconsistent, or difficult to find (Ozieranski et al., 2021). Moreover, even where standardised databases exist, they typically capture only a subset of connections based on their specific regulatory framework. This complicates the search further, as definitions of COIs vary vastly across contexts—even within medicine itself (Morciano et al., 2016). Journalists must therefore navigate scattered sources: publications, corporate registers, transparency lists, institutional disclosures, and information provided by experts themselves.

Consequently, they often remain dependent on what their sources define as a COI at any given moment. While efforts exist to provide overviews of different COIs in medicine and (bio-)medical research, they often cover only specific subsets (Wiersma et al., 2024) or remain broadly defined (Akl et al., 2022; Chimonas et al., 2021).

This article addresses this gap by developing a conceptual compass for navigating COIs in (bio-)medical contexts and asking: What types of COIs exist in (bio-)medical research and practice, and how can they be systematically mapped to support investigative work?

Through analysis of academic literature, guidelines, and disclosure frameworks across research, clinical practice, and policy-making contexts, we map possible structural, social, and material connections in (bio-) medical practice and research. Complementary expert interviews, conducted in parallel, capture how COIs are currently dealt with in practice and explore whether structured approaches could support investigative efforts. The data also provides a first assessment of whether this systematisation captures the COIs that journalists recognise in practice. Given that journalists operate as important gatekeepers in uncovering undisclosed connections, understanding their investigative practices and what challenges them is essential for developing practice-oriented transparency tools.

The comprehensive overview serves a threefold purpose. First, it functions as a reference tool enabling journalists to systematically navigate common COIs as they investigate researchers, evaluate expert sources, or scrutinise institutional practices. Second, the framework’s structure as a matrix should facilitate its application in potential AI-based systems for better detection and analysis of COIs in the future. Third, it encourages further theoretical work on COIs as well as the role of journalism in this context.

2. Theoretical Background

2.1. *What Makes a Conflict?*

Although understandings of COIs overlap across many professional groups, there is no internationally recognised definition. Even within medicine, various definitions exist (Morciano et al., 2016). However, a concept developed by Thompson (1993) has largely prevailed and underpins, e.g., the influential 2009 Institute of Medicine report. It defines a COI as “a set of circumstances that create a risk that professional judgement or actions regarding a primary interest will be unduly influenced by a secondary interest” (Lo & Field, 2009, p. 46).

According to Thompson (1993, p. 573), primary interests are those “determined by the professional duties of a physician, scholar or teacher”—meaning patient well-being, scientific integrity, and quality education. Secondary interests include financial benefits, relationships, professional recognition, career advancement, and personal affiliations. Thompson emphasises that secondary interests are not inherently illegitimate and may constitute an integral part of professional practice by supporting primary interests. Crucially, a COI is initially a risk arising from the coexistence of primary and secondary interests: “A conflict of interest exists whether or not a particular individual or institution is actually influenced by the secondary interest” (Lo & Field, 2009, p. 47).

This distinguishes Thompson’s concept from frameworks that ask authors to declare “potential COI,” as e.g., applied by the International Committee of Medical Journal Editors ([ICMJE] 2026). Here, a conflict exists only once inappropriate influence has occurred. Klemperer and Lieb (2018, p. 7) criticise this approach as fundamentally impractical as “the motives that trigger human judgment and action can only be presumed, but not proven.” Our article therefore follows Thompson’s and the Institute of Medicine’s definition.

2.2. *Categorisation of COIs: An Inconsistent Guessing Game*

Approaches to categorising COIs typically differ with regard to their conceptualisation of secondary interest as involving financial or material gain. This is the case, for example, when researchers or clinicians receive payments for talks, hold shares, or accept gifts. This is referred to as a material or financial COI. Such benefits may originate “from healthcare industry companies...industrial interest groups, commercially oriented contract research organisations, insurance companies/insurance providers, or from public funding bodies (e.g., ministries), self-governing bodies/institutions, foundations, or other funding sources” (Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften [AWMF], 2020) and may be directed at individuals or institutions. The value exchanged can range up to stock ownership worth several million euros. These connections may be unilateral and passive (e.g., receiving a gift) or based on active exchange (e.g., payment for a talk). Non-material, non-financial, or intellectual COIs arise when professional, ideological, or religious interests, family relationships, friendships, or personal rivalries emerge as secondary interests (Garattini & Padula, 2019; Wiersma et al., 2024). These interests are also referred to as intrinsic or academic interests, terms that are used depending on the context (Wiersma et al., 2024).

Furthermore, guidelines and disclosure policies often distinguish between direct and indirect COIs, showing value-centred and recipient-centred understandings. Direct interests are often described as direct financial

interests. The AWMF, e.g., defines “direct financial interests” as “financial, personal, or institutional benefits,” while indirect interests, similar to non-material interests, encompass “clinical, academic, and personal interests” (AWMF, 2017, p. 2; see also European Medicines Agency [EMA], 2023; Schünemann et al., 2015).

In contrast, a recipient-centred understanding of direct and indirect conflicts exists. The National Institute for Health and Care Excellence ([NICE] 2022) and the General Medical Council (n.d.), for example, classify direct COIs as situations that provide a direct benefit to an individual. Indirect COIs, however, benefit the individual rather indirectly through third parties, such as employers or family members. In this framework, direct and indirect interests can be both financial and non-financial. The Thieme Group uses the same criteria to distinguish between economic (corresponding to direct) and private (indirect) relationships (Thieme, n.d.). The Cochrane Network (2023) and the WHO (2022) also employ this classification, albeit more narrowly defined, distinguishing financial COIs according to whether a payment is made to an individual (direct) or to an organisation (indirect).

A distinction based on the recipient of monetary benefits is also made by the European Federation of Pharmaceutical Industries and Associations ([EFPIA] 2019) and its national members: In transparency reports, they distinguish between payments from pharmaceutical manufacturers made to healthcare organisations or to healthcare professionals. The former are also referred to as institutional COIs, the latter as individual COIs (Akl et al., 2022).

3. Methodological Approach

3.1. Literature Review

In view of the different interpretations and the lack of a uniform definition of COIs, a hybrid search strategy to comprehensively map and systematise COIs in (bio-)medical research, practice, and policymaking has been applied, combining an integrated exploratory approach with citation-based snowballing and a systematic database search.

Publications and practice-relevant documents previously known to the authors served as starting points for an iterative search. Reference lists and citation networks of these sources were screened to identify relevant literature and documents. Additionally, keyword searches (“conflict of interest” AND “guidelines” OR “policy” OR “disclosure form” AND “medicine” OR “research,” both in German and English) on Google Scholar, PubMed, and Google were conducted to identify academic research, as well as guidelines, policy statements, and COI disclosure forms issued by societies, journals, research institutions, and regulatory bodies. The retrieved articles served as seed materials for citation-based forward and backward snowballing. The academic discovery tool Connected Papers was employed to facilitate the identification of further relevant literature through citation networks and related articles.

This exploratory approach allowed for the identification of a wide range of connections and situations discussed as COI across different contexts. Provisional saturation was assumed once additional snowballing rounds no longer yielded substantively new categories or dimensions of COIs relevant to the framework.

The exploratory and snowballing phases were conducted until late 2024. Informed by the concepts and categories identified during these phases, a systematic, keyword-based literature search was subsequently conducted on PubMed in December 2025 to ensure comprehensive coverage of the latest (bio-)medical literature for the present article. The search combined medical subject headings as well as free-text terms (see Supplementary Material A for PRISMA-Chart and search string).

The search included German and English-language publications published since January 1, 2020. In total, 303 publications were retrieved. After screening, six records were excluded as they had been covered by the snowball search. Three articles could not be retrieved as the full article was not available, leaving 294 reports assessed for eligibility. Of these, 196 reports were excluded as they didn't discuss different types of COIs or offered no differentiation (other than "financial" and "non-financial"). A further 83 were excluded for only retrieving from the Open Payments database—the 17 subcategories had been covered previously. One report was excluded due to language barriers, leaving 14 studies to be included.

3.2. Expert Interviews

To complement the exploratory phase, six expert interviews with German-speaking professionals in medical and science journalism were concurrently conducted in June and July 2024. The goal was to capture practical and contextual knowledge on how journalists currently identify, evaluate, and handle COIs in their work and to explore expectations towards potential assistance tools for COI research. The interviews also reflect which COI situations experts consider and encounter in their work, thereby providing material for a subsequent plausibility check of the proposed framework through deductive coding.

We explicitly chose experts with a high level of experience regarding COIs and the research system. Although many practical challenges may more commonly affect less specialised journalists, this approach allowed for the generation of in-depth insights and reflective engagement of the experts. Participants were selected to ensure diversity across roles, gender, and editorial contexts (Table 1).

Table 1. Overview of the participants in the expert interviews (anonymised).

Expert	Employment	Role	Specialisation
E1	Science editorial office	Editor	Medicine
E2	Public service broadcasting	Managing editor	Medicine, investigative
E3	Scientific institution	Managing editor	Public health information, journalist training
E4	Freelance (print/online)	Science journalist	Science (biotech, medicine; partly investigative)
E5	Public service broadcasting	Managing editor	Medicine, health
E6	Science YouTube channel	Editor	Science

Experts E2, E3, and E5 hold decision-making positions within their organisations. E4 can also be considered a decision-maker due to editorial autonomy. Decision-makers are defined as "experts for their respective organisation and close observers of decision-making processes, structures and changes" (Scheu et al., 2014, p. 76). Therefore, they should also play vital roles in dealing with COIs in editorial reporting. As we focused on COIs in (bio-)medical research, participants were not asked about their own COIs, in order to avoid any misleading framing of COIs in their responses. E1 was selected for their long experience in local journalism, a relevant perspective given the increasing diffusion of (bio-)medical reporting beyond dedicated desks.

Recruitment drew on professional visibility mainly among professionals affiliated with familiar editorial organisations, and was complemented by referral-based recommendations.

All interviews were conducted as semi-structured interviews (average duration: 40 minutes) via Zoom. Interviews were audio-recorded, transcribed (using NoScribe), and analysed using qualitative content analysis (Kuckartz & Rädiker, 2022). MAXQDA was employed for the coding process using a comprehensive codebook (see Supplementary Material B) that covered both journalistic practices (e.g., investigating COIs, disclosure decisions, perceived barriers, and expectations toward support tools) and types of COI. To ensure coding consistency, intracoder reliability was assessed through time-delayed recoding of interview E1 using MAXQDA, yielding an overall agreement of 92.52% at an 80% segment overlap and 89.8% at a 90% overlap threshold. Coding combined inductively developed categories with a deductive component: For COI types, the systematisation from the literature-based typology served as an a priori category system. This approach allowed a systematic post-hoc assessment of whether COI situations described in the interviews could be mapped onto the proposed framework.

All participants' comments were anonymised throughout the research process; quotations presented were translated from German into English by the authors and will display the initial of the interviewee.

4. Findings: Mapping COIs

The review of guidelines, academic research, and disclosure forms allowed us to identify a variety of connections and scenarios that, depending on the individual context, constitute a COI. Identified connections were collected and clustered according to shared structural characteristics. Recurring groupings from declaration forms and literature served as initial points of orientation, but were critically reassessed and adapted, ultimately leading to a framework of four material and four non-material dimensions (Table 2).

Table 2. Overview of the eight dimensions.

Material	Non-material
Proprietary rights and dividend payout	Beliefs & stances
Industry marketing	Interests regarding career or research
Non-research partnerships	Interpersonal relationships
Research partnerships	Wish for status and respect

The framework is designed for conceptual comprehensiveness—it maps the range of COIs discussed in the literature rather than reflecting the relative weight of empirical evidence or assessing their relevance.

The following sections provide a detailed account of the specific COI constellations within each of the identified dimensions. Figure 1 maps the framework schematically (see Supplementary Material A for the underlying sources).

COIs are understood as potentially manifesting across both material and non-material dimensions, which may co-occur and take different forms within a single case. Importantly, these dimensions are not mutually exclusive. For instance, regular contact with a medical device representative may constitute a material COI within the “industry marketing” dimension if a clinician receives gifts, samples, or complimentary meals.

The same interaction may also represent a non-material COI within the “interpersonal relationships” dimension if the representative maintains a longstanding relationship with the clinician.

4.1. Material Dimensions

4.1.1. Proprietary Rights and Dividend Payouts

Regarding patents, utility models, and royalties, scientific advances are frequently accompanied by patent or utility model applications. They may be filed by researchers, affiliated institutions, or commercial partners and cover pharmaceuticals or medical products such as vaccines, medical devices, surgical instruments, or genetic markers (European Patent Office, 2025). Although patents do not necessarily generate immediate income, they may be licensed in exchange for fees or revenue-based royalties. Patent holdings are therefore widely regarded as material COIs and are commonly subject to disclosure even at the stage of planned applications (e.g., The Cochrane Network, 2023; ICMJE, 2026). Income through royalties and licenses is often listed separately (e.g., ICMJE, 2026; NICE, 2022).

In regard to shares, stock options, and investments in sector funds and companies, beyond intellectual property rights, equity holdings are also considered financial COIs. The economic performance of (bio-)medical companies is sensitive to information on drug development and regulatory decisions, with development news as well as decisions made by the US Food and Drug Administration having measurable effects on stock returns and share prices (Cho et al., 2024; Vedd et al., 2019). Some sources therefore differentiate funds based on whether the individual can influence their composition (e.g., EMA, 2023; NICE, 2022). Some guidelines also request disclosure of holdings by the individual’s spouse or children (Springer, n.d.).

4.1.2. Industry Marketing

As direct-to-consumer advertising of prescription medicines is restricted in many countries, companies often focus marketing on healthcare professionals, particularly those in influential decision-making roles. In the US alone, industry spending on marketing directed at healthcare professionals amounted to \$20.3 billion in 2016, including \$5.6 billion for the deployment of pharmaceutical representatives, \$13.5 billion for free drug samples, and approximately \$260 million for meals, travel, and accommodation costs (Schwartz & Woloshin, 2019).

Concerning donations and sponsorship, industry support may take the form of sponsorship or donations, typically defined as voluntary funds, assets, or services provided without contractual obligations of reciprocity (EFPIA, 2019). Besides money, they often include funding for teaching materials, equipment, infrastructure, scholarships, or educational programs (Hensley, 2019). Sponsorship differs in that it involves financial, material, or service-based support in exchange for a defined counter performance (EFPIA, 2019).

As for continuing medical education and conferences, in many countries, physicians are required to complete continuing medical education, a substantial share of which is at least partially financed by healthcare companies (Wienke & Hübner, 2022). These include company-funded symposia, including reimbursement or discounts of conference fees, travel, or accommodation. Such arrangements may increase the attractiveness of specific events and shape educational agendas, speaker selection, or thematic focus (e.g., Lempert et al., 2019).

In regard to promotional gifts, sample packs, and sponsored meals, regular interactions with industrial representatives often involve free drug samples, promotional materials, invitations to meals, or educational resources (Fickweiler et al., 2017). According to Chen (2022), physicians perceive these interactions as an efficient way to obtain information on new drugs, devices, and procedures through direct exchange, while representatives gain the opportunity to disseminate targeted information. While often low in monetary value, such benefits may influence professional judgment through reciprocity effects.

4.1.3. Non-Research Partnerships

Physicians and researchers may engage in active collaboration with pharmaceutical companies and interest groups; typical forms identified in disclosure guidelines and literature include paid consulting, advisory board participation, expert assessments, teaching activities, and authorship roles. Unlike industry marketing, these interactions are formally defined by a reciprocal exchange of compensated professional services.

In regard to paid consulting activities, pharmaceutical and medical device companies frequently engage clinicians and researchers as paid consultants, with fees accounting for a substantial share of industry compensation to physicians (Cuomo et al., 2021). Such collaborations are typically formalised through consulting contracts and may be project-based or ongoing, including roles on advisory boards, steering, or data monitoring committees (Koch & Lieb, 2018).

Clinicians and researchers may receive honoraria for expert testimony or expert assessments for courts, regulatory authorities, insurers, law firms, or professional bodies. The receipt of remuneration from interested parties may itself constitute a COI. In addition, paid (co-)authorship arrangements may involve the production of journalistic contributions, informational materials, or educational content on behalf of companies or interest groups (Chimonas et al., 2021)

There is also peer-to-peer marketing, which comprises, e.g., paid lectures, speaker bureaus, and social media. Peer-to-peer marketing refers to promotional activities conducted by clinicians and scientists toward other healthcare professionals. Commonly discussed forms include paid lecturing or teaching at industry-sponsored events, sometimes organised by speaker bureaus (Reid & Herder, 2013), where companies influence content by defining topics or even providing slides (Koch & Lieb, 2018). Such activities also extend to digital platforms, disseminating paid endorsements or promotional content to professional audiences (Persaud et al., 2024).

4.1.4. Research Partnerships

Here, we first have industry-funded drug trials. Research partnerships commonly involve roles such as principal or sub-investigator in industry-funded clinical trials, patient recruitment, or contract research arrangements (EMA, 2023; Murayama & Marshall, 2024). Participation in such research may entail sponsor influence on study design, data access, interpretation, or publication rights (Schott et al., 2018).

Second, there are post-marketing surveillance studies and “seeding trials”. Physicians in outpatient care may receive honoraria for participation in post-marketing studies, which collect data on already approved pharmaceuticals during routine clinical use. Although prescribing solely for study enrolment is prohibited, they may create financial incentives to preferentially prescribe the observed product (Koch et al., 2020).

Closely related are so-called seeding trials, which are formally structured as clinical research but primarily serve to familiarise physicians with new drugs and stimulate prescribing behaviour (Schott et al., 2018).

Third is the guest and honorary authorship. In Western research systems, physicians and researchers are often not financially compensated for publishing their research. However, companies may commission publications written wholly or in part by ghost authors (Schott et al., 2018). Closely related is the practice of guest, gifted, or honorary authorship, including reciprocal authorship arrangements or paid use of reputable experts' names.

Finally, there are employment relationships and third-party research funding. Physicians and researchers are often employed by hospitals or research institutions and thus operate within structural dependencies that may influence professional decision-making. As Klemperer (2011) notes, any remuneration system generates financial incentives—for example through performance-based compensation or minimum case volume requirements. This includes holding positions in or ownership of pharmaceutical, medical device, or biotechnology companies, or running a private medical practice with direct financial exposure to treatment decisions. A further structural source of material dependency is third-party funding. It can be made available to the university, one institution, or individual researchers. Such funding includes endowed chairs, industry-funded research projects (including salaries), and donations—allocated to institutions, departments, or individual researchers (Murayama & Marshall, 2024; Springer Nature, 2018).

Figure 1 provides an overview of the different dimensions of COIs in medical practice and research discussed above.

4.2. Immaterial COIs

Compared to material COIs, immaterial COIs receive considerably less attention in the literature and have been characterised as being of “lower ethical priority” (Goldberg, 2020, p. 1). In disclosure forms, they are often only briefly addressed. Some authors have questioned whether immaterial interests should qualify as COIs at all, arguing that they have been constructed as an ethical issue by leading figures in evidence-based medicine and COI policy development (Bero & Grundy, 2016; Grundy, 2021).

Nonetheless, concerns about their potential influence have increased (Resnik, 2023; Wiersma et al., 2024), and immaterial interests are now addressed in journal policies (Resnik et al., 2017), guideline-development frameworks (AWMF, 2017; Schünemann et al., 2015), and institutional disclosure requirements (General Medical Council, n.d.; NICE, 2022; The Cochrane Network, 2023; Thieme, n.d.). To systematise immaterial COIs in health research, Wiersma et al. (2024) identify five recurring types: Belief- or position-based, career-related, interpersonal, research-related, and status-related conflicts. These categories form the basis for the following dimensions.

4.2.1. Beliefs and Stances

Immaterial COIs may arise from strong moral, political, philosophical, ideological, or religious beliefs (American Association for the Advancement of Science, n.d.; Wiersma et al., 2024). Firmly held positions on morally or ethically contested issues may constitute COIs when they create a risk that professional judgment is shaped by prior commitments rather than by available evidence. Akl et al. (2022) suggest that even

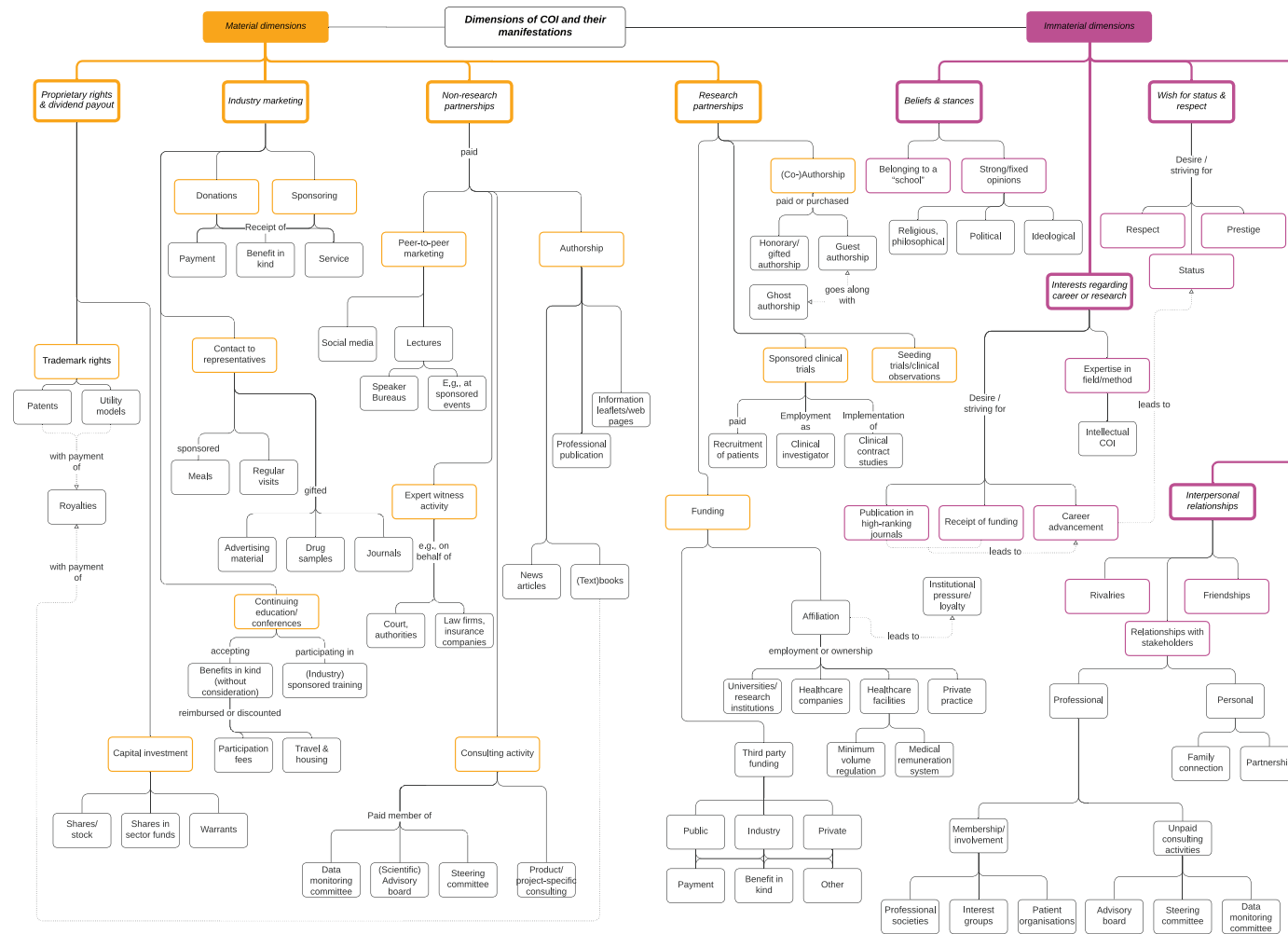


Figure 1. Dimensions of COIs in medical practice and research. Notes: Four material (purple) and four immaterial (orange) dimensions are distinguished (thick, coloured outlines); each dimension comprises groups of relationship constellations that constitute COIs (thin, coloured outlines), which can be further specified into different manifestations (black); the categories are not exhaustive and are intended to provide an overview, not to suggest an equivalent weighting in empirical evidence or relevance; some categories under the dimension “non-research partnerships” can also be considered a form of industry marketing.

personal characteristics such as gender, age, race, physical or psychiatric conditions, and sexual orientation make up a secondary interest and therefore a COI. While personal characteristics may be an implicit factor in decision-making, they are usually not considered a secondary interest. They may, however, influence the development of moral commitments or firmly held views, which are considered a factor in a COI.

A related constellation concerns affiliation with specific therapeutic or professional schools, such as surgical traditions or schools of psychotherapy, or alternative medical approaches, as addressed by e.g., Klemperer (2011), AWMF (2017), and Thieme (n.d.).

4.2.2. Interests Regarding Career or Research

Career-related conflicts include the pursuit of professional advancement, institutional pressures, loyalty to organisations, identification with a specific discipline or set of practices, or protection of intellectual legacy (Wiersma et al., 2024). Someone who built their reputation and life's work on a specific approach may face difficulty objectively evaluating contradictory evidence. Schünemann et al. (2015, p. 549) therefore consider "being an acknowledged expert in the intervention" a COI.

In research contexts, recurring drivers include acquisition of funding, publication in high-impact journals, confirmation biases, awards or recognition, and validation of one's intellectual capabilities (Wiersma et al., 2024). These pressures are intensified by evaluation systems emphasising metrics such as publication counts, citation indices, and grant success rates, rather than greater scientific or clinical importance (Plevris, 2025). Notably, several of these drivers also carry material implications (e.g., "career advancement"). However, the underlying non-financial pressures represent a distinct risk for bias in their own right—as noted, dimensions are not mutually exclusive.

4.2.3. Interpersonal Relationships

Personal relationships are considered relevant when connections exist with individuals whose economic or ideological interests may affect a professional decision. These may include family ties, friendships, intimate or mentoring relationships, and personal rivalries (e.g., American Association for the Advancement of Science, n.d.; Thieme, n.d.).

Professional relationships include activities in scientific societies, professional associations, self-governing institutions (e.g., health insurance companies), patient and consumer advocacy groups, or other associations (AWMF, 2020). Unpaid activities in an advisory board, steering or data monitoring committee also fall into this category (EMA, 2023; ICMJE, 2026; Resnik, 2023; Springer Nature, 2018).

4.2.4. Wish for Status and Respect

Among the least discussed immaterial COIs are those related to the pursuit of status (meaning the position within a hierarchy), respect (meaning a positive moral assessment), and the desire to achieve priority in discovery or to avoid stigma. According to Wiersma et al. (2020), they are commonly discussed with other immaterial conflicts, e.g., holding academic titles or engaging with industry as a way of gaining status. Interestingly, it may also work the other way around: The authors found that engagement with industry may also be met with loss of respect.

4.3. Journalistic reporting on COI: An Insight Into Practice

Across the interviews, journalists reported awareness of a broad range of COIs (Figure 2). Material COIs related to non-research partnerships were mentioned by most interviewees, particularly paid lectures, consultancy activities, reviewing work, and positions on supervisory boards. Research-related COIs—such as clinical trials, third-party funding, and employment relationships—were also regularly discussed.

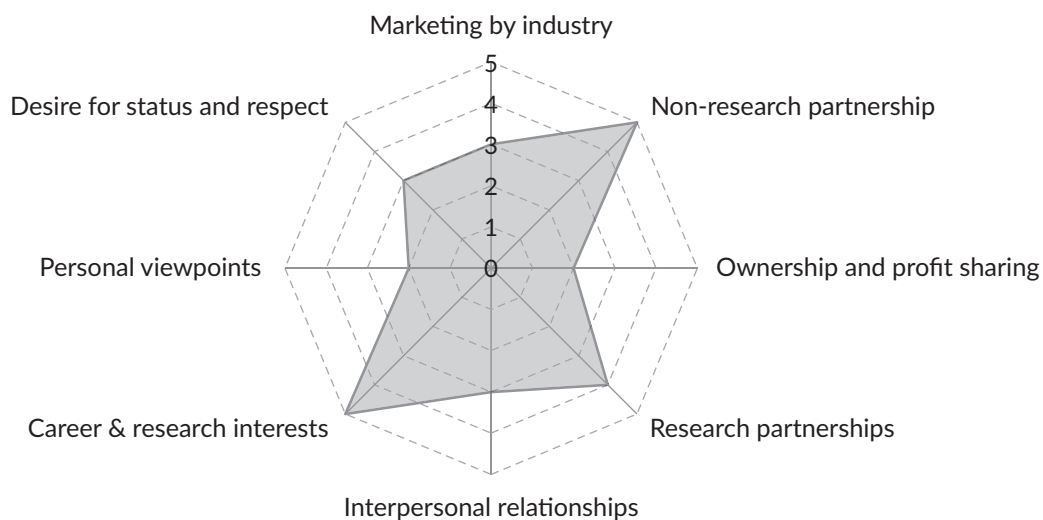


Figure 2. Dimensions of COI referred to in the expert interviews. Notes: Based on qualitative coding ($N = 6$); interview statements were assigned to predefined COI dimensions derived from the concept introduced in Figure 1; this figure provides an illustrative overview instead of a lengthy list within the text and indicates the presence of a dimension in the interviews but does not quantify frequencies or intensities of mentions.

Several interviewees addressed industry marketing strategies, including sponsored continuing education, participation in specialist conferences, reimbursement of travel expenses, and the acceptance of small gifts. Ownership and profit interests played only a marginal role in the interviews.

Beyond material aspects, immaterial COIs featured prominently in the interviews. Almost all journalists pointed to ambitions regarding research and career as well as interpersonal relationships, including memberships in commissions or supervisory boards, but also personal and professional connections between researchers, friendships and rivalries alike:

If you have a very small field, then people review each other's papers and then, of course, try not to be too critical....It can also be that there is someone who is exactly the opposite, who is very vehemently of the opposite opinion. (E6)

Status and reputation were also discussed, with interviewees noting that academics may seek to preserve their standing. Several statements indicated that material and immaterial COIs cannot always be clearly separated.

Looking for COIs, interviewees reported consulting a variety of sources including clinical studies, peer-reviewed publications, conference papers, CVs, project lists, institutional websites, medical associations, professional guidelines, prior media coverage, and publicly accessible transparency databases

such as the German registry of the Freiwillige Selbstkontrolle für die Arzneimittelindustrie. Some also consult external actors, such as watchdog organisations or peers in the field.

Interviewees emphasised several limitations for investigating COIs. These include limited access to information, for example due to journal access restrictions, deliberate non-disclosure or incomplete disclosure by experts, and time constraints. While E2 estimated that a basic COI investigation could be completed within an hour, others estimated around two hours for a comprehensive check, making time a limiting factor.

The interviewees unanimously reported that they do not follow a generalised procedure for dealing with an identified COI. Instead, decisions are described as situational, dependent on first impressions and made on a case-by-case basis, often in consultation with editorial teams. Context was described as decisive:

That is also always context-dependent. You know, it's a transfer of € 10,000 to a doctor. That's not problematic or not problematic per se. You have to look at what he is getting the money for. Is there an appropriate service or not? (E2)

One interviewee referred to such questions also as a "gut feeling" that prompts further investigation when expert statements appear unusual or problematic. Another reported intensifying investigation when new methods or therapies have been presented as exceptionally positive or, conversely, strongly criticised.

Several factors influence how the experts assess the relevance of a COI (Figure 3). These include the possible financial benefit, its temporal distribution, and the extent to which it supports the expert's ongoing work. For example, E1 noted that a COI becomes more relevant when it "contributes significantly to maintaining his work and his research in some way" (E1).

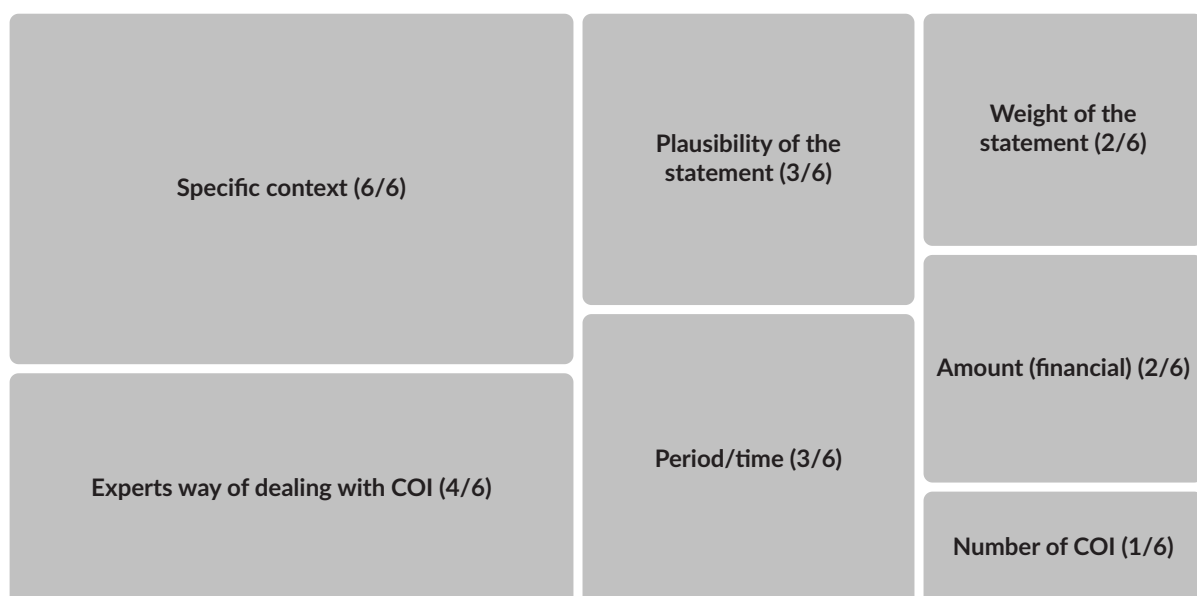


Figure 3. Illustrative overview of factors that determine how COIs are handled, as mentioned in the interviews. Notes: The figure indicates whether a factor was referred to at least once in the interviews ($N = 6$) and does not represent frequencies or intensities of mentions.

Importantly, interviewees emphasised that the number of COIs is less decisive than how experts disclose and reflect on them. COI assessment is thus framed as a qualitative judgment that weights credibility, plausibility, and transparency rather than as a mechanical filtering process.

Journalistic responses to COIs range from exclusion to contextualised inclusion of a source. Several interviewees—particularly those working in investigative journalism—reported avoiding experts with extensive COIs altogether. Others noted that experts with COIs may still be used as background sources but should not be presented as neutral authorities. When experts with COIs are included in reporting, transparency regarding their position and interests is widely regarded as essential. As one interviewee stated: “I think you can write anything in journalism as long as you clearly state where it comes from” (E6).

At the same time, interviewees differed in their views on the appropriate extent of disclosure, ranging from contextual, threshold-based approaches to calls for more systematic transparency in journalistic reporting.

COIs were widely perceived as a structural feature of science and medicine rather than exceptional cases. Close relationships between academia and industry were not framed as inherently problematic; instead, interviewees consistently emphasised transparency as key.

Against this background, five of the six interviewees criticised the current disclosure situation in Germany, particularly its voluntary nature. Several expressed negative views of the Freiwillige Selbstkontrolle für die Arzneimittelindustrie transparency initiative and emphasised that the possibility for recipients to withhold consent makes it unclear whether missing entries indicate the absence of payments or non-disclosure.

Following a prompt on possible supporting tools, interviewees expressed strong support for the development of an assistance system to facilitate the identification and documentation of COIs. Such a system was believed to increase transparency and reduce the likelihood of missing something. Interviewees emphasised the importance of comprehensive documentation, including information on individuals and companies, financial sums, timeframes, employment relationships, co-authorships, and media appearances. Voluntary registration by journalists themselves was also mentioned.

Participants agreed that informational depth is desirable, expressed in statements such as “the more detailed, the better” (E1) and “the more transparent, the better” (E2). At the same time, most rejected purely algorithmic assessments of COIs. Such evaluations were seen as neglecting context and risking misinterpretation.

Despite general support for increased transparency, interviewees also raised concerns about unintended consequences. As argued by E2, even negligible payments can be misread as proof of bias by lay audiences. Several noted that individuals who disclose COIs openly may face scrutiny, while less transparent actors remain less visible. This asymmetry was viewed as a structural problem, underscoring the need for careful contextualisation. Interviewees also stressed the importance of transparency regarding the system’s own funding, data sources, and limitations, as well as explanatory communication clarifying that absence from a database does not imply absence of conflicts.

5. Conclusion

Watchdog science journalism plays a central role in scrutinising the black box of scientific knowledge production. In an expert-centred public sphere, where scientific authority strongly shapes public understanding, clinical practice, and policy decisions, journalists act as key accountability actors. Their ability to identify, contextualise, and communicate COIs is essential, yet constrained by fragmented disclosure regimes, inconsistent definitions, and the systemic nature of many dependencies.

Using (bio-)medical research as an exemplary field, this article developed a conceptual compass for navigating COIs by triangulating expert interviews with exploratory and systematic reviews of academic literature, guidelines, and disclosure forms. While existing definitions have remained fragmented across research, clinical, and policymaking contexts (Morciano et al., 2016), using diverging definitions and often only addressing subsets of COIs (e.g., Wiersma et al., 2024), our methodological approach integrates them into a single typology. The resulting eight-dimensional framework maps a broad range of material and immaterial connections that constitute COIs and illustrates that they are rarely isolated or exceptional. Rather, they are embedded in overlapping structural, social, and economic relationships that characterise modern health research systems.

By conceptualising COIs as risk situations (Thompson, 1993) rather than evidence of misconduct, the framework enables investigative scrutiny without presuming intent or corruption. This perspective reflects both established theoretical approaches and journalistic practice. The expert interviews suggest that specialised science or even investigative journalists regularly dealing with COIs largely perceive them as a structural feature of science rather than as a deviation. Correspondingly, they emphasise transparency as a key criterion for appropriate reporting. However, findings on general news coverage suggest that this standard substantially deviates from broader journalistic practice. Empirical studies indicate that experts' COIs are regularly disclosed and contextualised in only a minority of media reports (e.g., Wilson et al., 2009).

Across the interview material, all COI situations described by the experts could subsequently be assigned to the proposed framework through deductive coding. While this post-hoc alignment does not constitute a formal validation or demonstrate exhaustiveness of the typology, it provides a first empirical indication that the framework captures COI constellations that journalists recognise in practice. The interviews further show that COI research and reporting remain situational and context-dependent, relying on professional judgment rather than standardised procedures. Journalists weigh relevance, proportionality, disclosure behaviour, and credibility under conditions of limited time and incomplete information, underlining the need for more structured approaches. The framework proposed in this paper also represents a first step toward addressing this need in the future, while the interview findings offer initial insights into what journalists would expect from dedicated assistance tools for COI detection.

Besides its contribution to COI scholarship, our conceptual compass may strengthen watchdog science journalism as well as its teaching in several respects. First, it provides a structured reference that supports more systematic investigations of expert sources, institutional affiliations, and funding relationships. Second, it fosters reflexivity by helping journalists reflect on their own potential COIs. Third, by foregrounding the systemic and sometimes legitimate origins of many dependencies, it helps journalists distinguish between structural conditions of knowledge production and conflicts that warrant critical reporting. This distinction is

crucial also from a societal meta-perspective: On the one hand, overly critical reporting that portrays all industry connections as inherently corrupt risks undermining public trust in science itself, triggering “science-related populism” (Mede & Schäfer, 2020). On the other hand, insufficient scrutiny allows problematic influence to go unchecked. Proportionate, context-sensitive reporting is therefore central to the watchdog function.

Beyond its analytical value, the framework offers a first foundation but also a corrective for data-driven and AI-assisted systems aimed at improving the detection and documentation of COIs by aggregating dispersed information. Keeping in mind the limitations imposed by the poor quality of COI data, the framework could help formulate better key questions for both traditional journalistic investigation and effective prompting (see Supplementary Material C).

Several limitations of this study should be acknowledged. The conceptual mapping is necessarily shaped by the scope of the reviewed material and cannot claim exhaustive coverage of all possible COI configurations. The framework is intentionally descriptive rather than evaluative and does not provide criteria for ranking or algorithmically assessing COIs. In addition, the empirical insights are based on a limited number of interviews with German-speaking, highly specialised expert journalists, and should be regarded as examples of best practice, which cannot be generalised across media systems. Moreover, as the focus was on COIs in (bio-)medical research, we have neither assessed the COIs of the interviewees nor of journalism in general. However, further research could examine how dependencies within the media system itself shape science reporting practices.

Despite these limitations, the proposed conceptual compass provides a comprehensive and flexible starting point for scholarly analysis, teaching, and journalistic practice. By making the breadth and systemic embeddedness of COIs visible, it supports a more reflective, consistent, and proportionate form of watchdog science journalism—one that may strengthen accountability while preserving the credibility of science and journalism alike.

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Conflict of Interests

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Data Availability

Additional data and transcript excerpts are available from the authors upon reasonable request.

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Some translations of words or singular sentences into English were assisted by DeepL. The expert interviews were transcribed using the AI-powered transcription tool noScribe.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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Science Journalism on Controversial Fields: Contextualizing Audience Expectations and (Dis)Approval of the Watchdog Role

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Abstract

Journalism research differentiates between various conceptions of roles and societal functions that journalism is expected to perform. Previous research has mainly examined journalists' role perceptions, while audience views remain underexplored. However, in the context of science journalism on controversial scientific fields such as climate change or Covid-19, audience insights are particularly relevant given that media coverage may shape public perceptions of science and influence crisis responses. This study combines semi-structured interviews and focus group discussions to investigate what functions audiences expect from science journalism on controversial scientific fields, focusing on context-dependent (dis)approval of the watchdog role. Findings indicate that audiences expect science journalism to fulfill both traditional and science- or crisis-specific functions. Regarding the watchdog role, participants emphasized journalists' task of uncovering misconduct and scientific norm violations in research underlying policy decisions. However, participants also viewed watchdog journalism as a balancing act as there are many forms of inappropriate critical reporting that might foster distrust in science and media. The findings are discussed regarding their implications for journalism practice and the role of watchdog science journalism in shaping public perceptions of controversial science.

Keywords

audience expectations; controversial scientific fields; journalism; journalistic roles; science communication; scientific norms; watchdog science journalism

1. Introduction

Journalism research traditionally distinguishes different normative ideas of what roles and functions journalists should fulfill for society (Hanitzsch & Vos, 2018; Mellado, 2015). Previous research focused on content analyses of media coverage and journalists' role perceptions, while audience views and interpretations of watchdog journalism are less researched. In this context, Riedl and Eberl (2022) and Vos et al. (2019) highlight the necessity of including audience perspectives into research on journalistic role perceptions—given that audience approval is a basis for both the legitimation of journalism's societal role and the economic functioning of journalism. Regarding journalism related to science, audience insights are argued to be particularly relevant for journalism on controversial scientific fields. Prominent examples of such fields include Covid-19 and climate change as both address topics situated at the center of highly politicized public debates, with members of the public disagreeing on how the knowledge produced in these research fields should be incorporated into (crisis) decisions (Gligorić et al., 2024; Suldovsky et al., 2019). Media discussions of scientific knowledge associated with these fields may influence crisis responses and shape public perceptions of science (Mihelj et al., 2022; Ophir et al., 2024).

Accordingly, the present study investigates the functions audiences expect from science journalism on controversial fields. Using a partly inductive approach, a special focus is placed on the watchdog role in these expectations as well as its context-dependent audience (dis)approval (Skovsgaard et al., 2024). Regarding methods, this study draws on a combination of semi-structured interviews and focus group discussions. This study contributes to a more holistic understanding of journalistic roles and audience expectations (Riedl & Eberl, 2022) in the context of reporting on controversial scientific fields, informing both journalism research and practice as well as future investigations of media reporting and its effects on public perceptions of controversial science.

2. Literature Review

2.1. *Journalistic Roles and the Context of Controversial Scientific Fields*

In journalism research, as in social sciences in general, a “role” concept usually “describes the sum of norms, ideals, privileges, and duties associated with a social position” (Krüger et al., 2022, p. 65). Following Hanitzsch and Vos (2017, p. 115), the present study theoretically conceives journalistic roles as “discursively constituted.” Hanitzsch and Vos (2017) point out that journalists' roles can be studied from different perspectives: regarding normative ideas of what journalists should do, cognitive orientations of what journalists intend or want to do, professional practice of what journalists actually do, and narrated performance of what they say they do. Empirical insights for cognitive orientations and narrated performance are often gained through quantitative journalist surveys or interviews and focus group discussions with journalists (e.g., Krüger et al., 2022; Ojala & Pöyhtäri, 2018) while professional practice is often analyzed through content analysis of news coverage (e.g., Márquez-Ramírez et al., 2020; Nolan et al., 2024). Normative ideas, however, are negotiated societally and held by audiences as well. As “agents of socialization” (Hanitzsch & Vos, 2017, p. 129), they may contest, (re)create, and (re)interpret journalistic roles, contributing to establishing specific public images and expectations of journalism (Hanitzsch & Vos, 2017, 2018). However, audience perspectives have been far less researched compared to the other perspectives (Riedl & Eberl, 2022; Skovsgaard et al., 2024; Vos et al., 2019). Past research on normative roles

and functions of journalism has introduced a variety of different typologies. One very influential typology is the one from Mellado (2015, 2020), an analytical framework distinguishing the interventionist, watchdog, loyal-facilitator, service, infotainment, and civic roles.

The thematic focus of journalistic roles has often been on political reporting (e.g., Hanitzsch & Vos, 2018; Ojala & Pöyhtäri, 2018; Riedl & Eberl, 2022), while the contexts of science journalism (Fahy & Nisbet, 2011; Polman et al., 2014) and crisis contexts (Klemm et al., 2019; Skovsgaard et al., 2024) have been less researched. Depending on the concrete topic or domain, both journalistic role perceptions and audience expectations may shift, and typologies need to be adapted or understood relationally and context-specific (e.g., Fawzi & Mothes, 2020; Klemm et al., 2019; Roney et al., 2025). For instance, focusing on German and Finnish journalists' role perceptions in the context of health crisis reporting, Klemm et al. (2019) adopted several broad professional roles, such as interpreters, watchdogs, and translators. Another identified role was that of a public mobilizer, which involves encouraging self-protective actions and promoting socially responsible behavior toward others. Drawing on interviews with UK and US science journalists, Fahy and Nisbet (2011) have developed a science journalism-specific role typology that builds on general journalistic roles but addresses domain-specific role interpretations (e.g., civic educator, conduit, agenda-setter).

Regarding controversial scientific fields, again, a context-sensitive understanding of journalistic roles and corresponding audience expectations is necessary. Scientific fields can be regarded as controversial when they deal with issues that lie at the heart of intensely politicized public debates and segments of the public disagree about how the knowledge and evidence generated in these research areas should inform (crisis) policymaking decisions (Gligorić et al., 2024; Suldovsky et al., 2019). Prominent examples of controversial scientific fields are Covid-19 and climate change. For both fields, public discussions intensively thematize the evidence produced in these fields. While this evidence is not necessarily considered controversial or contested within science (especially in the case of most climate science research), the evidence may create situations of post-normal science communication (see Funtowicz & Ravetz, 1993; Lörcher et al., 2024), often producing societal controversies, e.g., regarding the individual implementation of science-based recommendations and interventions (Gligorić et al., 2024; Suldovsky et al., 2019). Due to such controversies, science journalism plays a central role in forming public opinion on controversial fields, influencing crisis responses, and shaping public perceptions of science (Mihelj et al., 2022; Ophir et al., 2024). Moreover, reporting that does not meet audience expectations in the case of controversial fields like Covid-19 or climate change may fall at risk of damaging public trust in science and (science) journalism in times where trustful relationships between the public, science, and (science) journalism are very much needed (Bromme et al., 2022; Nicolaisen, 2022; Schug et al., 2025).

Given the shortcomings of previous research (e.g., the missing focus on audience expectations), the relevance of science journalism on controversial scientific fields as a science- and crisis-related information source (Mihelj et al., 2022; Ophir et al., 2024), as well as the need for a holistic and context-sensitive understanding of journalistic roles and audience expectations (Riedl & Eberl, 2022; Roney et al., 2025; Skovsgaard et al., 2024), this study aims to connect audience expectations towards science journalism to controversial scientific fields. Accordingly, this study asks:

RQ1: What functions do audiences expect from science journalism on controversial scientific fields?

2.2. Audience (Dis)Approval of Watchdog Science Journalism

The “watchdog” counts as a well-researched journalistic role that is recurring across different topical domains (e.g., politics or science; see Fahy & Nisbet, 2011; Riedl & Eberl, 2022). Watchdog journalism is considered necessary for functioning democracies, with watchdog journalists critically monitoring powerful public actors as a fourth estate (Mellado, 2015; Waisbord, 2000). Concerning science reporting, recent research ascribes the watchdog function an increasing relevance, given that fraud, misconduct, and norm violations seem to become more common in science and are already subject to various kinds of science journalism (Brainard & You, 2018; Mede et al., 2025; Schug et al., 2026). For instance, in the context of science coverage of biomedical Covid-19 studies, Schug et al. (2026) found that print media heavily referenced the scientific norms of communalism, universalism, disinterestedness, organized skepticism, and originality (Merton, 1973; Ziman, 2000) and their (un)fulfillment by reported studies. In this regard, norm violations related to researchers’ and research institutions’ motivations (disinterestedness) and critical challenging of studies (organized skepticism) were found to be important aspects of Covid-19 science media critique. Related, Mede et al. (2025) used the example of “Retraction Watch” and their X page to investigate norm discourses in hybrid media systems. On a content level, a broad range of ethical and epistemological norm violations was reported. However, they also found that audience participation and user engagement were relatively low (see Mede et al., 2025).

These findings raise questions on how watchdog science journalism can meet audience expectations and what defines “good” and approved or “bad” and disapproved watchdog journalism in the public eye—especially with regard to controversial scientific fields and post-normal situations challenging traditional norms of science, society, and journalism (Lörcher et al., 2024). From a normative perspective, watchdog science journalism that, for instance, exposes pseudo-science or debunks science-related conspiracy theories can be considered functional and societally important (Ardèvol-Abreu, 2022; Nguyen & Catalan-Matamoros, 2020). However, previous research on audience expectations of watchdog journalism has found that (dis)approval is individual and context-specific (e.g., Riedl & Eberl, 2022; Skovsgaard et al., 2024). Concerning political reporting, expectations and (dis)approval contexts of watchdog journalism depend on factors related to the media and political system (Riedl & Eberl, 2022). Regarding general Covid-19 reporting, audience demands for watchdog journalism depend on audience characteristics (e.g., political ideology and party preference) and context-specific functions and forms of critical reporting (Skovsgaard et al., 2024). For instance, while generally supporting watchdog journalism regarding crisis-relevant actors (especially politicians), audiences expressed discomfort when journalists adopted a self-promotional tone or when watchdog journalism was overly negative, nitpicking, or one-sided, or when the reporting denied portrayed actors the opportunity to respond or clarify their positions (Skovsgaard et al., 2024).

Building on this line of research, this study places a special emphasis on the watchdog role and its (dis)approval contexts when analyzing journalistic roles in the context of reporting on controversial scientific fields, paying tribute to the role’s status as a prerequisite for a crisis-proof society (Márquez-Ramírez et al., 2020; Mellado, 2015; Skovsgaard et al., 2024). This decision was also strengthened empirically, as the watchdog role was discussed prominently but also controversially concerning RQ1. Accordingly, the author posed a second research question that is partly inductively derived from the material, extending the findings of RQ1:

RQ2: In what contexts do audiences (dis)approve watchdog science journalism on controversial scientific fields?

3. Methods

To explore these RQs, a qualitative approach was chosen, combining individual semi-structured interviews and focus group discussions. Triangulating both creates a nuanced understanding of audience views, representing individual perceptions and expectations and also recreating interpersonal communication about science news (Lambert & Loiselle, 2008; Yang & Stone, 2003). The latter is especially relevant when focusing on controversial fields, given the high practical relevance of science news on research findings, leading individuals to communicate with family, friends, colleagues, or also strangers about science-related news (Wagner & Reifegerste, 2023). Such communication can help process, discuss, and evaluate science-related information, potentially contributing to more effective crisis coping (Wagner & Reifegerste, 2023).

3.1. Design, Sample, and Procedure

Both the individual semi-structured interviews and the focus group discussions were conducted by MA students within the scope of communication science classes at the University of Augsburg, guided by the author. In both studies, participants were recruited through a convenience sample by the class participants based on quota plans; potential participants were from broader publics (but not working in science), German-speaking, and at least 18 years old. Before participating, participants were briefed concerning the conversation topics and signed an informed consent statement in line with the privacy policy of the University of Augsburg (see Supplemental File III). Ethical aspects, data protection information, and a note that study participants can skip questions or quit the study at any time were repeated at the beginning of each interview and focus group discussion (see topic guides in Supplemental File I; Niederberger & Zwick, 2023). While all focus group discussions were conducted online via Zoom, the individual semi-structured interviews were partly conducted face-to-face (six interviews) and online via Zoom (nine interviews), depending on the geographical availability and preferences of the participants as well as the availability of suitable premises.

For the interviews, 15 study participants were recruited using quotas on age (equal distribution of younger [18–35 years old] and older [>35 years old] participants) and gender (equal distribution of female and male participants). Class participants were also asked to aim at an equal distribution of education in terms of people with and without “Abitur” (German higher education entrance qualification), without using an explicit quota. This procedure resulted in a sample relatively balanced regarding age, gender, and education (age: minimum = 21, maximum = 67, $M = 35.6$; gender: 53.33% female; education: 53.33% with Abitur). All interviews were conducted in December 2023, and the length was between 45 and 150 minutes ($M = 78.07$ minutes).

For the focus group discussions, another 55 participants were recruited to participate in eight focus groups with six to nine participants per group. To approximate real social constellations in which science news are discussed and to increase the participants’ willingness to discuss (Fitzpatrick & Mayer, 2022; Stehr et al., 2023), the eight groups were put together homogenous in terms of age and education: two groups consisted of younger (18–35 years old) participants with Abitur; two groups consisted of younger participants without

Abitur; two groups consisted of older (>35 years old) participants with Abitur; two groups consisted of older participants without Abitur. Class participants were also asked to aim for an equal distribution of gender in terms of male and female participants, without using an explicit quota. The overall sample was relatively balanced regarding the targeted quota (age: minimum = 18, maximum = 70, $M = 35.4$; gender: 56.36% female; education: 50.91% with Abitur). All focus group discussions were conducted by three moderators each between February and March 2025. They took between 82 and 125 minutes ($M = 99.88$ minutes).

Both interviews and focus groups were semi-structured and followed a similar topic guide. Students were intensively trained using those guides as interviewers and focus group moderators. This training also included preparations for difficult interview and focus group discussion situations (e.g., handling crying or arguing participants, handling participants with strong anti-science attitudes; Fitzpatrick & Mayer, 2022; Niederberger & Zwick, 2023). While the main questions and sections remained constant, the focus group discussion guide contained fewer detailed questions to allow enough time for interactive discussion (Stehr et al., 2023). The main part of the guides focused on a stimulus-based discussion of science coverage of controversial fields. Here, material derived from a content analysis of Covid-19 print media coverage was used (Schug et al., 2026), supplemented by examples from climate science coverage. The material consisted of selective science coverage excerpts (just texts, no media templates) in which five cases of scientific norm negotiations (communalism, universalism, disinterestedness, organized skepticism, and originality; see Merton, 1973; Ziman, 2000) as a form of watchdog science journalism (Mede et al., 2025) were displayed successively. Covid-19 and climate change were selected as examples because both represent societally very prominent controversial scientific fields, even though both fields may differ significantly concerning the underlying scientific consensus and how this consensus is represented in public discourse. The author assumed that, due to the high societal and media presence of these fields, respondents would be able to express topic-related attitudes and discuss them in detail. The science coverage excerpts contained critical media evaluations of reported studies' and related researchers' or research institutions' transparency and availability (communalism), inclusiveness or exclusiveness (universalism), research motivations and interests (disinterestedness), attitudes towards and appliance of critical challenging (organized skepticism), and innovativeness as well as theoretical and/or practical relevance (originality). For the interviews, these examples displayed norm fulfillments and participants were asked to think aloud (Bilandzic, 2017). Follow-up questions then asked participants to elaborate on how they would perceive the media coverage in a reverse case, i.e., a norm violation, serving to approach perceived (dis)approval contexts of watchdog science journalism (RQ2). For the focus group discussions, the individual thinking aloud was left out, and the stimulus material was directly discussed. Four groups were confronted with five cases of norm fulfillment. These have been the same as the ones used for the interviews, but were slightly adapted due to some wording confusion that occurred during the interview study. The other four groups were confronted with five cases of norm violations. For all groups, again, follow-up questions asked participants to elaborate on how they would perceive the media coverage in a reverse case. While the examples used as stimulus material represented print media coverage, the following discussions centered science journalism independently from media type. Both interviews and focus group discussions were concluded with questions on overall expectations of science coverage of controversial scientific fields (RQ1). The topic guides and the stimulus material used are added as Supplemental File I in the German original version and in an English translation.

3.2. Analysis

All data were transcribed using f4 (<https://www.audiotranskription.de/en>; partly with computer assistance for automatic transcription) and analyzed by the author according to reflexive thematic analysis (Braun & Clarke, 2006, 2019). Following Braun and Clarke (2019, p. 594), themes were created “at the intersection of data, analytic process and subjectivity.” Accordingly, all transcripts were first inductively coded and initial codes emerging from the data were step-wise collated into themes that were refined and finalized in several (re-)coding steps (Braun & Clarke, 2006, 2019). Using a step-wise coding and reviewing approach, the author carefully identified dividing and uniting elements of the codes generated. For instance, regarding RQ1, initial codes like “calling attention to societally important research and evidence,” “reaching issue-fatigued publics,” or “educating about the *modus operandi* of science” were collated into a theme that addressed the journalistic role of mediating between science and society on different levels. After re-coding the material to check for the applicability of such a theme as well as additional dimensions included in other initial themes, this theme was finally labeled as the role of a “science-society agent.” Existing typologies and analytical frameworks (especially Fahy & Nisbet, 2011; Fawzi & Mothes, 2020; Hanitzsch & Vos, 2018; Klemm et al., 2019; Mellado, 2015, 2020; Riedl & Eberl, 2022; Skovsgaard et al., 2024; Vos et al., 2019) informed the analytical process (Braun & Clarke, 2019), functioning as orientations for defining the scope of individual themes as well as for determining the final role designations. Examples and detailed explanations are described in Section 4.

Ultimately, the coding process resulted in six different journalistic functions or roles (RQ1) and six (dis)approval contexts (RQ2). The themes are summarized in Tables 1–3 in Supplemental File II. As contexts, the author considered the participants’ perceived broader societal developments and circumstances in which science reporting was situated (Skovsgaard et al., 2024). These perceptions are individually based on prior knowledge and preconceptions of the respondents (e.g., regarding the general societal role of science and media, previous experiences with science and media, or expected conditions of news production and impact of the reporting) that become approachable as the result of “deep and prolonged data immersion” (Braun & Clarke, 2019, p. 591). To protect the privacy of participants, pseudonyms have been used for quoted material. Direct quotes included in Section 4 were translated manually by the author. Supplemental File IV lists all direct citations included in the manuscript in their original and translated version.

Due to the similar topic guides, interviews and focus group data provided insights into the same dimensions. Comparing both datasets, statements from the focus group participants generally appeared a little more reserved (e.g., concerning the articulation of more critical science views) as participants across all groups seemed to be quite consensus-seeking. As the author did not detect any further differences, the results outlined in Section 4 make no comparison between the interview and focus group data. However, quotes from the material still include an “FG” or “I” note next to the participants’ pseudonym to indicate whether the person participated in a focus group discussion or an interview.

4. Results

4.1. Expected Functions of Science Journalism Concerning Controversial Fields

4.1.1. Service Provider

As service providers (Hanitzsch & Vos, 2018; Mellado, 2015, 2020), study participants expected science journalists to organize the confusing and overloaded scientific discourse around topics like climate change or Covid-19. Especially regarding Covid-19, some participants perceived a science-related “information flood” (I_Amelia, 21 years old). Accordingly, science journalists should carefully overview all new studies, filtering practical information and recommendations derived from scientific evidence, e.g., regarding climate-friendly or Covid-19 protective behavior (e.g., I_Leon, 24). Moreover, regarding fields like Covid-19 or climate science, journalists should consider that they do not necessarily target only science-interested but ordinary citizens:

An ordinary citizen, who is only confronted with this in societal life on an exceptional basis, is probably mainly interested in the things that then affect him personally in his life, such as vaccination issues, what am I allowed to do, and so on. (I_Sebastian, 30)

4.1.2. Between Conduits and Interventionists

Study participants regularly mentioned that they expect science journalism on controversial fields to act in a tension between rather neutral conduits (Fahy & Nisbet, 2011) and interventionists (Mellado, 2015, 2020). Accordingly, most participants expect science journalism to (neutrally) translate abstract scientific information from experts to non-specialist publics. However, study participants were more divided concerning active commentary. For instance, Markus (I, 37) was generally skeptical of reporting on controversial scientific fields that went beyond neutral information dissemination:

[Science journalism on such controversial fields shouldn't be] steered in a particular direction, presented in a suggestive manner, and then sold as if this is the new truth, but simply stick to the things that are clear. Yes, who did it? What is [the scientist's] background, what were [the scientist's] results and conclusions, and present it just as objectively, without introducing any interpretation.

4.1.3. Between Anti-Infotainers and Marketers

Many study participants do not expect science journalism on controversial fields to perform infotainment (Mellado, 2015, 2020) and, for instance, focus on personalization or sensationalism in their reporting. Accordingly, applying such news factors in science reporting could lead to both science journalism and the science it reports to lose reputation (e.g., FG_Lana, 23). Some participants reject a focus on individual scientists and their private lives: “Yes, I think it's very important to report in a way that is as impersonal as possible. That means focusing on the issue itself and not on individual characters” (I_Anna, 23). As a negative example, many participants mentioned the German tabloid *Bild*.

However, some participants also demand the entertainment function to spark public excitement for scientific issues (e.g., I_Henriette, 56). This entertainment function was also mentioned to be important for

science journalists to fulfill their role as marketers (Riedl & Eberl, 2022; Vos et al., 2019), ensuring their economic survival in order to, in the long term, continue to represent a counterweight to fake news and less professional journalism. Melanie (I, 54) said: “I think the problem is that good journalism costs money and isn’t free. [Regarding the entertainment function], you must differentiate between quality journalism on the one hand and amateurishness or even interest-driven opinion-making on the other hand.”

4.1.4. Science-Society Agent

The function of a science-society agent is somewhat new, but it contains qualities from previously discussed journalistic roles such as public forum (Fawzi & Mothes, 2020), agenda setter, and civic educator (Fahy & Nisbet, 2011), or change agent and mediator (Vos et al., 2019). In this role, science journalists covering controversial fields are expected to mediate between science and society on different levels, for instance, by serving as research-related agenda setters, calling public attention to societally important research and evidence. In the case of the climate crisis, many participants mentioned that they expect incessant and constant reporting on new findings and their implications, even if some stories are not necessarily economically viable. In this regard, participants highlighted science journalism’s function to also keep issue-fatigued and science- and media-critical publics informed (e.g., I_Erika, 67; FG_Luisa, 24). Moreover, as science-society agents, science journalists should educate about science (e.g., its methods and *modus operandi*), contributing to an increased science literacy and a trustworthy and functional science-society relationship, potentially by demonstrating their own trust in science through their reporting (e.g., I_Henriette, 56).

4.1.5. (No) Public Mobilizer

Participants articulated a very context-specific expectation of the public mobilizer role (Klemm et al., 2019). On the one hand, journalists should mobilize their audiences, e.g., regarding evidence-based climate or Covid-19 protective behavior (e.g., I_Leopold, 21). According to Amelia (I, 21), such reporting should also focus on the benefits of evidence-based behavior, e.g., staying home to save lives or saving the environment by reducing the individual carbon footprint. On the other hand, for some participants, acting as public mobilizers was related to causing (unnecessary) panic, especially when the scientific evidence justifying mobilization efforts appeared fragile to them (e.g., I_David, 37; FG_Nora, 23). For Lana (FG, 23), science journalism that reports on controversial fields may sometimes legitimately cause panic, but she underlines that mobilizing reporting should include concrete options for action as well, as she illustrates regarding her impressions from climate science reporting: “It’s five past 12 and the world is going to end the day after tomorrow and everything is really terrible. And what can be done about it isn’t really being reported.”

4.1.6. Between Watchdogs and Loyal-Facilitators

Participants often referred to the watchdog function (Mellado, 2015, 2020). For instance, Melanie (I, 54) expects science journalists covering issues like Covid-19 or climate change to “engage with critical opinions and substantiate their sources. In other words, they mustn’t simply parrot what others say but must maintain a certain critical distance.” Following Tim (FG, 26), a critical attitude is connected to the credibility of science journalism: “When the media report on something and are already raving about it themselves, it makes it less credible in my view.”

However, some participants prefer to reject the watchdog function in favor of a loyal-facilitator role (Mellado, 2015, 2020). Such rejection was mainly due to the perceived crisis character associated with fields like Covid-19 and climate science. In both crises, societal and political decisions were perceived as almost solely based on scientific evidence. For some participants, critical science investigations by science journalism are not necessary in such contexts. Moreover, the media could focus on giving credible scientists a platform and audiences unfiltered access to those scientists. For instance, both Henriette (I, 56) and Leopold (I, 21) mentioned that regular situation assessments of the German virologist Christian Drosten were sufficient to assess the current Covid-19 situation, and the media could have invested more to spread his (unfiltered) opinions even more widely.

4.2. (Dis)Approval Contexts of Watchdog Science Journalism Concerning Controversial Fields

4.2.1. Approval Contexts

First, some study participants approve watchdog science journalism when it is “challenging the (alleged) scientific consensus.” Especially with Covid-19 or climate issues, few study participants feel betrayed or manipulated by an unrealistic scientific consensus pictured in established media (e.g., I_Erika, 67). They appreciate watchdog journalism that provides counter-information and unheard critique (I_Doris, 54). Participants emphasized that sometimes no one in their personal environment could give them such information or that such critique may otherwise be hardly accessible. Moreover, participants hope that watchdog journalism challenging an (alleged) scientific consensus could lead society to reconsider political directions taken based on Covid-19 and climate science evidence (I_Barbara, 28; I_Hannah, 24). “It doesn’t mean an insight is wrong just because it goes against the mainstream,” Leopold (I, 21) said.

Second, watchdog science journalism is often approved if it is “drawing the line between ‘good’ and ‘bad’ science.” When science journalists investigate the background of a study in detail, e.g., underlying motivations, study method details, or the appropriateness of the scientific practices used, and the result of their investigation is communicated through their reporting, audiences can form credibility or trustworthiness evaluations (e.g., I_Barbara, 28; I_Leon, 24). This concerns rewarding and drawing attention to good scientific practices (e.g., cases of scientific norm fulfillment by reported studies or scientists) but also unveiling unreliable science (e.g., I_Henriette, 56; FG_Rebecca, 39; FG_Sarah, 18). Accordingly, study participants value if scientific norm violations are communicated, especially concerning communalism (e.g., transparency) and disinterestedness (e.g., underlying motivations and conflicts of interest):

So, it’s important that the results are always presented together with the institution or whoever initiated them, so that society has the opportunity to contextualize them. Where do they come from, and what might people be trying to achieve with them? And if those goals are indeed self-enrichment or profit, then it must be communicated. (I_Barbara, 28)

Unveiling norm violations and cases of scientific misconduct is particularly relevant for watchdog science journalism that covers controversial fields like Covid-19 or climate science, as society must identify research that should have no significance for Covid-19 or climate policy decisions (I_David, 37). As Josha (FG, 24) says:

So, if it involves medical matters, or politically significant decisions, or major financial decisions that are made as a result, then I think it's much more important that it's reviewed [by journalists] than if it's just small studies that don't have any real impact on the lives of many people.

Lastly, study participants approved watchdog science journalism when it was “picturing ‘real’ science.” Accordingly, unveiling violations of scientific norms or cases of scientific misconduct could transport a picture of scientists as human beings who make mistakes like everyone else (I_Henriette, 56). As perfect scientific conduct may be unrealistic, an important aspect of watchdog science journalism should also be to contextualize scientific misbehavior in terms of how the present scientific system works and what mistakes and norm violations may be considered usual or human (e.g., FG_Tobias, 40). For instance, this concerns scientists who are exposed by watchdog science journalism as self-interested, profit-oriented, or non-transparent—aspects that are not necessarily reprehensible (I_Erika, 67). In the long term, watchdog science journalism that makes scientific misconduct a subject but also contextualizes it could therefore dispel misconceptions regarding society's expectations of science and individual scientists (I_Anna, 23).

4.2.2. Disapproval Contexts

First, watchdog science journalism is disapproved when participants notice “poor treatment of (media-inexperienced) scientists.” This is the case, for instance, when audiences perceive that pictured scientists are treated disrespectfully (e.g., I_Henriette, 56). Some participants mentioned that they found this even more striking when it concerned epidemiologists or virologists that, at the beginning of the pandemic, suddenly became highly sought-after experts. They were probably insecure and overstrained due to missing media experiences and consultation options (FG_Bernhard, 33; I_Henriette, 56; FG_Ines, 36). Watchdog science journalism is disapproved if it takes advantage of that (e.g., by decontextualizing statements or letting scientists fall into traps). Participants, therefore, called for sensitive training and treatment of media-inexperienced scientists. Tobias (FG, 40) believes that poor treatment could have long-term effects on the willingness of such scientists to cooperate with the media.

Second, participants disapprove watchdog science journalism when reporting includes “inappropriate, hasty, or biased critique.” This can concern criticizing actors' features, e.g., journalists' or media's lack of expertise or domain-specific training (e.g., I_Melanie, 54). Moreover, some participants mentioned that the critique needs to be addressed to the correct addressees. In the case of Covid-19 or climate science, where policy is often derived from scientific evidence, science should only be criticized for its research and not made responsible for political decisions (e.g., FG_Tobias, 40). However, inadequate, hasty, or biased critique most often concerned content production and reporting characteristics. For instance, this concerned unbalanced or inappropriate expert choices like politicians cited to criticize a scientific study (e.g., I_Leopold, 21) or critique derived from unspecified or uncited “experts,” “reports,” “videos,” or “studies” (e.g., FG_Amelie, 24; FG_Jürgen, 35). It also concerned cases in which critique is unsecured or based solely on speculation. In this regard, Leon (I, 24) said: “In most domains [of journalism], the societal relevance simply isn't so extreme that one couldn't express information that's 75% accurate or speculative. I believe science reporting on areas like Covid-19 simply can't afford that.” Participants were also skeptical if the critique appeared motivated or biased (e.g., in line with media's or journalists' political ideology; see I_Barbara, 28; FG_Julius, 24; FG_Jürgen, 35). Watchdog science journalism was also disapproved if critique was based on superficial arguments (e.g., scientists' character or private life; see FG_Bernhard, 33) or unrealistic demands towards science. The latter includes expectations

of scientific studies having no limitations or certainty levels, research projects not having any (even small) associated financial interests, basic research directly solving societal problems, or preprints drawing 100% finalized conclusions (I_Anna, 23; FG_Florian, 24; FG_Jürgen, 35; FG_Oskar, 23). Lastly, some participants said they disapprove of watchdog journalism that generally lacks background information and two-sidedness in reporting (e.g., I_Hannah, 24; I_Matt, 23) or that cherry-picks single negative aspects of a study (FG_Oskar, 23).

Finally, watchdog science journalism is often disapproved when journalists appear to be “accepting or not considering negative consequences” of their reporting. This is especially the case if science journalists generalize from the misconduct of individual scientists to the whole scientific community, potentially contributing to a negative image of scientists or distrust in science in general (e.g., FG_Frederik, 68; I_Leon, 24). Moreover, watchdog journalists should be aware that if their reporting meets some of the disapproval criteria described above, it may lead to decreasing interest in science-related topics like Covid-19 or climate change (I_Anna, 23), biased opinion formations regarding evidence-based behavior (FG_Isabell, 24), as well as increasing “Lügenpresse” (“lying press”; see Koliska & Assmann, 2021) accusations and distrust in (science) journalism in general (e.g., FG_Antonia, 22; FG_Maximilian, 23).

5. Discussion

Drawing on the theoretical concept of journalistic roles (Hanitzsch & Vos, 2017) and a methodological combination of semi-structured interviews and focus group discussions, this study investigated what audiences expect from science journalism on controversial fields and the contexts in which audiences (dis)approve the watchdog function.

Results indicate that audiences expect science journalism covering controversial scientific fields to fulfill not only traditional roles like the service provider or the watchdog (Mellado, 2015), but also crisis-specific roles like the public mobilizer (Klemm et al., 2019) and science-specific roles like the conduit (Fahy & Nisbet, 2011). The identified functions outline a comprehensive and complex set of requirements for science journalists, which may be difficult to fulfill; some functions are only expected in specific contexts and expectations seem to depend on a person's attitude towards both science and journalism in general and controversial topics like Covid-19 or climate change. Similar forms of the identified roles were also found in previous research. However, there are some concrete details and tensions that may be unique to the case of science journalism on controversial scientific fields. These details and tensions may be less likely to occur when focusing on other scientific fields that are less relevant to crisis decisions and for which audiences may not hold strong attitudes towards journalistic roles in reporting. For instance, an adequate implementation of the entertainment function (e.g., by using entertaining narratives; see Bloomfeld, 2024) was almost exclusively seen as the domain of quality journalism while tabloid-like entertainment focusing on sensationalism and the private life of highly visible scientists (e.g., Butler et al., 2021) was seen negatively. Also, the expectation of science journalism as a public mobilizer was discussed controversially. Demands were rather expressed by participants that appeared to be in line with scientific recommendations regarding Covid-19 or climate change issues while participants with skeptical attitudes rather reject this role as it is more interpreted as a panic producer. The same applies to the tension between watchdog and loyal-facilitator roles. Most participants value the watchdog role; however, some see this role as rather inappropriate in crisis contexts relying on scientific evidence and demand more unfiltered information from the scientific community.

This tension regarding the watchdog role was further explored in RQ2. It was found that audience (dis)approval of the watchdog role was highly context-dependent and “good” watchdog science journalism needs to be understood as a balancing act. Some of the disapproval contexts identified are in line with normative demands of argumentation theory, e.g., regarding the appropriateness of superficial “ad hominem” arguments (see Barnes et al., 2018). However, for some (dis)approval contexts, this in-depth investigation also revealed concrete implications and audience-related recommendations for watchdog journalism practice. First, the participants appreciate watchdog science journalism highlighting violations of scientific norms (see Mede et al., 2025; Merton, 1973). For instance, unveiling potential conflicts of interest or non-transparent study method details can help the public identify unreliable science. Furthermore, participants approve watchdog journalism when it portrays science realistically, i.e., conducted by human beings that, of course, sometimes make mistakes. This finding implies that audiences want watchdog journalism to picture the “counter-norms” of science (e.g., Mitroff, 1974), contextualizing misconduct within the context of usual practices in the current scientific system. Such contextualization could contribute to educating audiences about the scientific *modus operandi*, potentially improving science literacy and limiting negative consequences of reporting (e.g., concerning the image and trustworthiness of scientists and [science] journalism). Some participants appreciate watchdog journalism if it challenges the (alleged) scientific consensus concerning Covid-19 or climate change topics. Possibly, this specific context-dependent approval is associated with political ideology (Riedl & Eberl, 2022; Skovsgaard et al., 2024) and individual attitudes towards climate change or Covid-19 protection measures. In this regard, science-skeptical audiences may (in vain) expect watchdog science journalism to counter the established discourse around these topics, fulfilling the role of rather “alternative” news media (Holt et al., 2019) and, in the German context, countering the established “lying press” (see Koliska & Assmann, 2021). Furthermore, audiences disapprove of watchdog science journalism that poorly treats media-inexperienced scientists. This finding underlines the necessity of respectful media treatment of scientists—to meet audience expectations but also to prevent scientists from developing skepticism towards media involvement (e.g., Marcinkowski et al., 2026; Skovsgaard et al., 2024). Lastly, audiences may reject watchdog journalism based on the media’s or journalists’ features, the chosen critique addressees, or the content production process and reporting characteristics. Accordingly, from an audience perspective, watchdog journalists could address such disapproval by considering an active and explicit communication of their own and the cited expert’s topic-related expertise as well as potential conflicts of interest.

Given these findings, it is important to note that science journalism practices not meeting audience expectations may contribute to perceived “expectation-evaluation discrepancies” (Fawzi & Mothes, 2020) and potentially erode science journalists’ professional credibility (Skovsgaard et al., 2024). Follow-up research should quantitatively compare audiences’ perceived importance of the roles identified and investigate to what extent unmet expectations and different disapproved watchdog journalism practices contribute to specific audiences migrating from established journalism or developing distrust towards science (journalism). For journalism practice, it will additionally be insightful to test the (potentially positive) effects of implementing some of the audience-approved watchdog science journalism practices, for instance, concerning a more nuanced contextualization of scientific misconduct within the scientific system’s *modus operandi*.

The present study also has limitations. First, this study is limited to audiences’ normative expectations and does not represent other dimensions in the context of journalistic roles (e.g., what journalists want to or

actually do; see Krüger et al., 2022). Also, regarding journalistic roles and functions, it is generally challenging to develop context-specific typologies that are free of interpretation-based category overlaps (Riedl & Eberl, 2022). For instance, in the present study, this concerns potential overlaps between the science-society agent and other previously discussed roles (e.g., Vos et al., 2019). Due to the qualitative approach, the categories identified provide an insight into the breadth and ambivalence of audience expectations but cannot be statistically associated with audience characteristics such as science-related media consumption or overall attitudes towards science (journalism). Regarding the interview and focus group procedure, participants were recruited through a student-based convenience sample. Moreover, the stimulus material centered on specific cases of watchdog science journalism (negotiations of scientific norms) and follow-up discussions mainly focused on Covid-19 and climate science as primary examples for controversial scientific fields. In this regard, qualitative follow-up research could attempt to orient questions concerning expectations of science journalism and (dis)approval contexts of watchdog journalism more strongly based on the understanding and definitions of the respondents regarding critical science reporting and controversial fields. Finally, follow-up analyses could try to identify differences in the perception of various controversial scientific fields and, in turn, link these differences back to individual topic-related attitudes and experiences of respondents.

6. Conclusion

Watchdog journalism remains virtually indispensable for society, particularly concerning crisis contexts and controversial scientific fields such as Covid-19 and climate science (Barel-Ben David et al., 2020; Mihelj et al., 2022). Precisely in such contexts, it is crucial that journalists respond to the needs and expectations of their audiences (Blanchett et al., 2024). Audiences not only shape public support for evidence-based decision-making through their media consumption; they also secure journalism's economic survival and provide valuable feedback for adapting and improving reporting practices. Consequently, journalists must take context-specific audience expectations seriously and critically reflect on practices that may provoke public disapproval. Only trusted and publicly legitimate watchdog journalism can fully exercise its democratic function as the fourth estate.

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Data Availability

Data can be shared upon reasonable request.

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Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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Scientific Watchdog Journalism in Latin America: A Challenge of Broken Mirrors

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Abstract

The watchdog role of science journalism, as a way of revealing wrongdoings in science-driven enterprises, is a recent and rather invisible practice in Latin America. From my 20 years as a practitioner, this commentary explores some structural causes of this phenomenon: insufficient training opportunities in science journalism; a weak perspective of the watchdog role; a cheerleader posture by the media towards science; symbolic and political links between media owners and scientific elites; and the vulnerable position of journalists due to fragile incomes, which compromises independence and critical thinking. I also underline a further watchdog role: to investigate, expose, and warn society about the misuses and abuses of scientific methods, processes, outcomes, and authority in the public domain. In this role, the watchdog journalist verifies scientific arguments invoked to make decisions. Lastly, I relate successful instances of watchdog science journalism in the region for the social evaluation of scientific knowledge and its impact on urgent Global South problems.

Keywords

journalism; Latin America; media; science journalism; watchdog journalism

1. What is Watchdog Science Journalism?

Several authors describe the watchdog role of journalism as one of denunciation, investigating irregularities contrary to the public interest committed by governments, businesses, organizations, or individuals. To Wallace and Knobel (2010, pp. 11–12), the best journalists perform a critical function seeking to root out the truth: “Exposing evil, exposing impropriety, exposing something that shouldn’t be happening, is our highest calling...in hopes that by shining a light on it, the light will purify.” This function implies not just pointing to isolated instances but revealing the underlying patterns of abuse and systemic negligence.

Furthermore, it requires describing context, identifying those responsible, and outlining potential consequences to warn citizens and empower them to prevent damages or make informed decisions (Coronel, 2009). However, this is not its only role. Kovach and Rosenstiel (2021) recall a less combative definition from the mid-1600s: Being a watchdog implies going from a simple stenographer to a curious observer who examines unseen corners of society. As they note, “the purpose of holding the powerful accountable also extends beyond simply making the management and execution of power transparent, to making known and understood the effects of that power” (Kovach & Rosenstiel, 2021, p. 225).

Applied to science journalism, the watchdog role implies at least two functions: On the one hand, investigating problematic aspects of science, from research malpractice and power networks to potentially harmful effects of its findings (Fleerackers et al., 2026); on the other, performing a systematic examination of decision-making processes, which means to investigate, expose, and warn society about the use or misuse of scientific evidence in public policy and societal contexts. As Crúz et al. (2014) conclude, “in particular, when public-policy decisions are made with or without the relevant scientific information, science journalists should see it as their watchdog duty to investigate and report on it, instead of complacently settling on the narrowest possible interpretation.”

In this sense, journalists who omit scientific content from stories that require it fail to defend the public interest by withholding information necessary for citizens to assess risks or make decisions. Existing research and my 20 years of experience in Mexico suggest watchdog science journalism is scarce in Latin America, creating an obstacle for society to critically evaluate scientific knowledge and its relevance to urgent regional problems.

2. Watchdogging Science and Scientists in Latin America

Regarding the narrower conceptualization of watchdog science journalism—monitoring and exposing bad science or fraud—Latin American studies are limited, suggesting a general lack of investigative science journalism. For instance, Meneses-Fernández and Santana-Hernández (2020, p. 41) analyzed coverage across 21 newspapers in Latin America and Spain regarding malpractice and fraud, and concluded that such coverage is infrequent, “superficial, often anecdotal, descriptive, profusely derivative,” and derived from sporadic cases rather than investigative follow-up.

Several factors hinder investigative science journalism. Identifying issues like data manipulation or falsification requires understanding research processes and scientific arguments (Crúz, 2024). In Latin America, media outlets rarely allow time for this, nor are these skills taught in universities. Without formal training, science journalists learn through practice, often failing to distinguish between watchdog and cheerleader roles (Rosen, 2017).

Added to this are time constraints and weak editorial involvement. Combined, lack of time, training, and editorial support make identifying fraud exceptional. The few Latin American journalists publishing on these topics usually work for Global North outlets which, unlike most regional media outlets, do offer legal counsel in the event of a lawsuit (e.g., Basilio, 2026; Gutiérrez & Pérez Ortega, 2020; Schiermeier & Mega, 2017). In cases of sexual abuse, harassment, or corruption within academia, finding individuals willing to file formal complaints remains difficult due to fear of academic exclusion, retaliation, and public shaming (Espinosa Luna & Corradi, 2026; Guizardi et al., 2025).

A second set of challenges stems from the media landscape, where implicit and explicit links between academia and media make exposing bad science difficult (Rosen, 2017). Media outlets often promote and protect the reputation of scientific communities, treating scientists as unquestionable authorities. Conversely, scientific institutions view media and journalists as promotional allies, reinforcing this through public relations campaigns or sponsored trips to conferences (Vara, 2007). Consequently, journalists struggle to launch investigations monitoring scientists while protecting themselves from potential backlash.

Labor precarity and poor working conditions across Latin American newsrooms also limit watchdog functions (Márquez-Ramírez et al., 2021; Massarani et al., 2021). Precarity turns journalism into short-term reporting on findings, events, or awards, driving it away from investigative conditions. Demands to produce additional content for social networks further drain reporters' energy and capacity for deep investigations (Bossio & Hutchinson, 2026).

Labor instability leads many journalists to transition into press officer roles (Rueda & Rosen, 2025). These shifting dynamics blur lines between PR and science journalism, weakening the freedom and interest to report on scientific irregularities. While freelancers might seem better positioned to resist these pressures, most face severe instability, long hours, and lack of benefits (Márquez-Ramírez et al., 2021). Given this vulnerability, it is easy to understand why journalists shy away from writing lengthy, in-depth pieces on corruption, negligence, or sexual harassment within the scientific community.

Finally, some journalists fear exposing flaws could undermine public trust in science, opening doors to pseudo-scientific narratives. Hesitation also stems from considering the precarious state of Latin American science, fearing critical reporting might jeopardize resources and funding (Rosen, 2017). Journalists wonder to what extent watchdog reporting might harm individual researchers rather than exposing systemic flaws. These constraints impede the growth of robust watchdog science journalism in Latin America, leading many journalists to conclude that a vigilant approach carries more risks than benefits.

3. Watchdogging Those Misusing and Abusing Science in the Public Domain

Given the multiple structural pressures that hinder watchdog science journalism focused on monitoring irregularities within the scientific community, I propose turning the spotlight on the second dimension of this role, which is an equally (or perhaps more) important—and also more feasible—dimension of this role: defending the public interest through fact-checking the use, misuse, and abuse of science in the public domain and the strategic inclusion of scientific content into the stories that require it. This perspective centers on incorporating scientific arguments that explain the reasoning behind conclusions, rejecting the principle of authority (Crúz, 2024). Gómez Gurrola and Cruz Mena (2019) propose a teaching methodology based on these ideas, demonstrating how reporters can learn to highlight empirical evidence and explanations as the essential means to resolve conflicts in a science story.

Adopting this watchdog function of science journalism would significantly increase the relevance of science journalism in Latin America. By providing the scientific arguments necessary to understand complex issues like environmental degradation or public health, journalists transition from mere translators to key actors who create conditions for active citizen participation. Ultimately, this watchdog function would empower society by providing it with the scientific information needed to participate in democracies and public decision-making.

4. Where to Go From Here

Despite the challenges, there are several Latin American media outlets that carry out the narrower definition of watchdog science journalism by questioning the financing, ethics, gender biases, and social impacts of knowledge production. Outlets like Agencia Pública (Brazil), Chequeado (Argentina), El Surti (Paraguay), Mongabay Latam (Latin America), Ojo Público (Peru), Pie de Página (Mexico), Salud con Lupa (Peru), and SciDev.Net (regional) lead these efforts. These projects thrive largely because they do not depend on governmental or academic funding. Instead, many are supported by international organizations dedicated to investigative journalism such as the International Center of Journalists or the Knight Foundation. Furthermore, outlets like *Salud con Lupa* and *Ojo Público* were founded and are led by journalists who previously worked in investigative departments within traditional media. Conversely, initiatives aligning with the second, broader conceptualization of watchdog science journalism are far fewer, with notable examples in Mexico including Radio Educación (*Hábitat Ciencia*) or TVUNAM (*Simbiosis*).

Rather than media outlets exclusively dedicated to covering science, it is more common to find investigative stories documenting the power structures that surround scientific and medical knowledge. Examples include investigations into industry interference in the development of health regulations (e.g., *Salud con Lupa*, n.d.) or the challenges within the dialogue between diverse knowledge systems to generate new insights (e.g., Pinedo, 2021). Within the second category of watchdog science journalism, notable efforts include explaining the role of science in searching for missing persons (e.g., TV UNAM, 2019) or uncovering the systemic reasons behind the crisis of diabetes-related amputations (e.g., Climent, 2018). Despite the profound relevance of these investigations, none of the mentioned outlets or programs enjoys the financial stability necessary to guarantee long-term survival, underscoring the vulnerability of independent media and the imminent risk of losing investigative science journalism in Latin America.

Given this situation, a fundamental question arises: What is required to ensure the survival of investigative, watchdog science journalism in a region that needs it so urgently? Finding a comprehensive answer will require the expertise of scholars and practitioners—some of whom are featured in this thematic issue—yet three key approaches can be proposed.

First, in terms of education, journalism programs must ensure that graduates possess the confidence to critically question scientists, rather than feeling as though they work for them. This requires instilling the core goals of watchdog journalism from the very beginning of their training, fostering an in-depth understanding of how scientific knowledge is produced in order to demystify it and encouraging early engagement with the scientific community through critical, rigorous interviewing.

A second avenue involves professional associations and networks of science journalists, which should actively seek ways to ensure that watchdog science journalism can be practiced without jeopardizing the careers of reporters who choose to engage in it. Potential actions include securing funding from organizations that sponsor investigative science stories, issuing public statements in response to instances of scientific fraud, and training their members to recognize the consequences of cheerleader journalism—especially in cases that require a critical perspective. Moreover, it would be beneficial to engage scientists themselves, educating them on the watchdog role of journalism as an inherent and necessary function of the profession.

Finally, it is urgent to further explore and develop academic research on watchdog science journalism, precisely as this volume does, not only to advance theory, but to demonstrate, with evidence, that failing to practice watchdog science journalism has consequences for societies, for the kind of science each country produces and for the necessary level of citizen participation in public decision-making.

5. Conclusion

Watchdog science journalism in Latin America is scarce but essential for citizen participation and democratic life. The “cheerleader” model, even if well-intentioned in its wish to promote the scientific culture, can also be a way to perpetuate systemic opacity and power structures that do not always serve the public interest.

In that sense, it is fundamental to keep strengthening the watchdog function in science journalism by going back to the basics: First, reinforce training in science journalism based on fact-checking instead of being an extension of PR. Second, create regional networks for the protection of journalists, which can also give them legal and financial support to develop complex investigative stories without the fear of reprisals or financial ruin. Lastly, changing science journalists’ self-perception is essential: When reporters recognize their crucial role in providing evidence for complex issues, they help citizens actively engage in decisions affecting their lives.

The success of independent media such as those mentioned previously demonstrates that there is a path towards a more critical and useful journalism for society. Strengthening those efforts and reinforcing a watchdog perspective, vigilant about science’s failures but also about the scientific content needed to make decisions, is the only way to guarantee that science journalism in Latin America becomes a real public service.

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Conflict of Interests

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