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2. Curating, transforming, constructing science news: The newsmaking routines of Science Media Center Germany

Abstract: Science Media Center (SMC) Germany contributes to the construction of science news with routines of curation, selection, framing, and broadcasting that bridge the norms of science and journalism. These include restricting the scope of scientific topics and sources; assigning scientific topics with contextual scientific, social, and journalistic relevance criteria; enhancing content with external expertise; and timing broadcasts with the intention of promoting, altering, or preventing coverage of science issues. In collective sense-making processes, editors negotiate both explicit and implicit knowledge about science and journalism, informed by input from scientific actors invested with explanatory power. Based on criteria of knowledge production from both science and journalism, these routines grant epistemic authority to the science content curated by SMC Germany.

Keywords: science journalism, science media center, newsroom ethnography, editorial process, COVID-19

1 Introduction

Science Media Centers (SMCs) are organizations that bridge the fields of science and news media, providing journalists with curated and freely accessible science content in the form of press releases, press briefings, and expert statements (Broer & Pröschel, 2021; Fox, 2012; Rödder, 2020). While scholarly interest in SMCs is rising (Broer & Pröschel, 2022; Buschow et al., 2022; Suhr et al., 2022), there is still a lack of insight into their newsmaking routines. Drawing on findings from an ethnographic newsroom study, this chapter explores the routines through which SMC Germany contributes to the construction of science news. I consider science news the result of a type of knowledge production in which scientific knowledge and expertise is located, filtered, and transformed to fit the norms of journalistic reporting. Following the literature on the epistemology of journalism (Ekström & Westlund, 2019; Ettema & Glasser, 1984; Matheson &

Wahl-Jorgensen, 2020), I am interested in the “*rules, routines and institutionalized procedures*” by which SMC Germany produces knowledge by curating scientific topics and expertise for journalism (Ekström, 2002, p. 260, original italics). Below, I first explore the rise of intermediaries in the production of science news before introducing SMC Germany as a case study. After outlining my methodology, I structure the routines through which SMC Germany contributes to the production of science news along five phases of news production: access and observation, selection and filtering, editing and processing, distribution, interpretation and feedback (Tandoc & Duffy, 2019). Throughout, particular attention is paid to the ways in which editors negotiate routines to overcome practical and epistemic challenges.

2 Third parties in the production of science news

As a result of technological and societal changes, the communication landscape between science, media, and the public has become more diverse in terms of actors, practices, and orientations (Broer & Hasebrink, 2022; Bucchi & Trench, 2021; Neuberger et al., 2019). The neoliberalization of scientific research has led to a rise in strategic science communication and a struggle for visibility (Raupp, 2017; Väliverronen, 2021). This trend is reflected in increased communication efforts by research institutions (Autzen, 2014; Friedrichsmeier et al., 2015), academic publishers (Franzen, 2012), and individual scientists (Peters, 2021). Meanwhile, professional science journalism, like other forms of journalism, has come under pressure. The development of digital media has led to losses in advertising revenue and subscriptions for traditional media outlets, resulting in the downsizing of newsrooms and an overall decline in professional science journalists (Dunwoody, 2021; Schäfer, 2017). The demands of the 24-7 news cycle and the rise of social media have placed additional pressure on science journalists to produce more content quicker, making in-depth coverage of scientific issues more challenging (Ashwell, 2016). This has led to alternative solutions (Carlson & Usher, 2016; Hepp & Loosen, 2022; Suhr et al., 2022) such as new types of organizations that outsource parts of news work to actors outside of traditional newsrooms. In science communication, this development manifests itself in the form of intermediary organizations which consciously position themselves in the gray areas of science communication (Gerber et al., 2020, p. 50; Görke & Rhomberg, 2017, p. 54).

Third parties between science and media have a long history in science communication (Moles et al., 1967). One example is the Science Service, a news syndicate founded in the United States in 1921 with the aim of translating and interpreting science for journalists (Nelkin, 1987, p. 87; Ritter, 1926, p. 200). A century later, Guenther and Joubert (2021) note the emergence of “novel interfaces” that use digital media to enhance the dissemination of scientific knowledge through the news media. The Conversation, for example, provides editorial support for scientists to write articles about their expertise (Guenther & Joubert, 2021), while SciDev.Net provides free reporting on science and technology with the goal of aiding sustainable development and poverty reduction (Trench, 2008), and SMCs curate scientific developments and expert statements for journalistic use (Broer, 2020; Rödder, 2020). All of these intermediaries share the common goal of increasing public attention to scientific issues with the aim of improving individual decision-making. In doing so, they aim to support the norms of liberal democracy and its principles of informed opinion-forming and decision-making (Nowotny et al., 2001). But they also challenge traditional roles, norms, and practices in journalism (Guenther & Joubert, 2021; Williams & Gajevic, 2013). Understanding how intermediary organizations produce science news is essential to understanding their potential implications for the future of science communication and journalism.

3 Case study: Science Media Center Germany

The non-profit organization Science Media Center (SMC) Germany, based in Cologne, is one of seven independently operating SMCs worldwide that aim to “inform public debate and discussion on the major issues of the day by injecting evidence-based science into headline news” (SMC U.K., 2012). To achieve this, these organizations provide registered journalists with free-to-use summaries of scientific research, and expert assessments of new scientific claims and current science topics in the public debate. The concept was born in the United Kingdom where the first SMC was established in 2002. Since then, others were founded (in chronological order) in Canada, Australia, New Zealand, Japan, Taiwan, Germany, Kenya and Spain. At the time of writing, however, the SMCs in Canada and Japan appear to be inactive. While the goals and missions of the international SMCs are similar, the degree to which they are aligned with either science or journalism varies. Whereas SMC UK was established as a “press office for science” (Fox, 2012, p. 257), SMC Germany was founded by members of the German professional association of science journalists (Wissenschafts-Pressekonferenz e.V.)

with the aim of supporting journalists in their work by making scientific research more accessible (Hettwer et al., 2013).

In 2020, SMC Germany had three pillars: the editorial department, which consisted of eight full-time editors working in the sections: (1) Health & Medicine, (2) Technology, Energy, Mobility & Artificial Intelligence, and (3) Climate & Environment. Second is the SMC Lab, which develops a variety of software to assist the editorial department. Third is the Innovation Digital Media (IDM) department, which was set up to support the development of new solutions at the interface between the editorial department and the SMC Lab. The Klaus Tschira Foundation (KTS) is the primary sponsor of SMC Germany. The organization also receives financial support from grants and donations. The organization's editorial autonomy is stipulated in its corporate charter (SMC Germany, 2021). During the time of fieldwork in 2020, SMC Germany had 800 journalists registered to receive content; at the time of writing in 2023, this number had risen to 1900 journalists.

Empirical research on SMCs is limited, although there has been increasing interest. There is some evidence that SMCs can influence how contentious science issues are presented in the media. Williams and Gajevic, for example, showed that SMC UK led a successful communication campaign in favor of more lenient regulations on research involving animal-human hybrid embryos (2013). Recent studies of SMC Germany have focused on its role in field repair and field enhancement for journalism (Buschow et al., 2022), as well as its role in science communication as a knowledge broker, trust broker, and value broker (Broer & Pröschel, 2022). Suhr and colleagues (2022) conclude that the organization type of SMC Germany, due to its particular financial setup and the structure of science journalism, cannot directly be transposed to other intersections between journalism and fields of expertise, e.g., in political or business reporting.

Despite this recent interest, however, there is still a lack of understanding of the internal workings of SMCs and the routines with which they contribute to the construction of science news (Rödger 2020). In order to fill this gap, I sought to uncover the editorial routines through which SMC Germany selects, transforms, and mediates scientific expertise to its journalistic audience. In the following paragraphs, I answer the following research question: through which routines does SMC Germany contribute to the production of science news?

4 Methodology

The insights on the routines of SMC Germany are based on ethnographic material. Newsroom ethnographies have a long tradition in journalism research, as seen in

the works of Fishman (1980), Schudson (1989), and Tuchman (1980). They allow researchers to open the “black box” (Stonbely, 2015, p. 260) of news production, as the situated practices that shape news remain a blind spot in studies using indirect data from retrospective interviews or content analyses (Ryfe, 2018). This is increasingly important given the rapidly changing journalistic environment (Cottle, 2009; Domingo, 2011; Westlund & Ekström, 2020).

During the first phase of fieldwork, I was present at SMC Germany from January 6 to 31, 2020, and participated in editorial and management meetings, informal conversations with staff, and had access to the organization’s collaboration software, Slack. Despite minor language barriers, I was able to gain a firsthand understanding of SMC Germany’s day-to-day operations. Due to the unexpected outbreak of the novel coronavirus in January 2020, the impact of the COVID-19 pandemic on SMC Germany’s routines also became a focus of the study. The second phase of fieldwork, conducted from October 5 to 30, 2020, allowed me to deepen previous insights and assess changes in practices, routines, and role understandings since the start of the pandemic. This phase of fieldwork consisted of both in-person and virtual components.

The final ethnographic material consisted of 28 semi-structured and unstructured interviews with all editorial staff, 42 field notes of editorial meetings, 168 SMC Germany broadcasts, and 62 chat logs. These were analyzed using the constructivist grounded theory approach (Charmaz, 2006: 23). The ethnographic material was analyzed using MAXQDA software. I began with open, line-by-line coding and focused coding to identify initial topics. Then I proceeded to axial coding to connect and form abstract codes.

5 Routines of SMC Germany

If news work is a construction of reality, routines are the situated practices, rules, and procedures through which this takes place (Ekström, 2002, p. 260; Molotch & Lester, 1974, p. 105). Although conceptualizations tend to focus on the ways that routines are shaped either by organizational contexts (Altmeyden, 2006, 2008) or by social practices (Ryfe, 2016, 2018) they typically come into being through interactions between both (Westlund & Ekström, 2020, p. 73). In the following, I structure SMC Germany’s routines along five stages of news production (Tandoc & Duffy, 2019): access and observation; selection and filtering; editing and processing; distribution; and interpretation and feedback.

5.1 Access and observation

Keeping an overview of scientific developments and the public debate on science is an important and challenging part of news work at SMC Germany. The organization has limited its key interests to research on medical, environmental, and technological topics, particularly those relating to mobility, energy, and artificial intelligence. These topics correspond to SMC Germany's three editorial departments and broadly reflect the top science issues covered by German media (Badenschier & Wormer, 2012). The division of its newsroom into topic-specific departments is akin to the "beat system" in traditional media (Fishman, 1980). The editors are expected to apply their so-called explicit knowledge (Grant, 1996; Patterson, 2013) to judge the significance of developments in distinct scientific subfields.

In addition, SMC Germany has set up editorial and automated sourcing practices. The main sources for new scientific findings are embargo e-mails from scientific journals and press releases from research institutions. The embargo system is widely used in science journalism (Hermida, 2010; Kiernan, 2006), and refers to the act of sending out announcements of upcoming scientific publications under a restrictive deadline. The embargo period should ensure that journalists have sufficient time to prepare for reporting on potentially complex topics (Franzen, 2014). In 2020, SMC Germany was subscribed to the embargo services of around 40 academic publishing journals, mostly belonging to larger publishing houses focused on medical, life, and natural sciences. These typically send out weekly embargo e-mails with the titles of upcoming scientific publications. Because the format of embargo e-mails varies widely, the in-house SMC Lab has developed software, internally referred to as "Newsdesk," that automatically scans and displays them in a standardized manner. Typically, the embargo period comprises seven days. SMC Germany editors use this time to select and report on new research.

Another source for new research are platforms like EurekAlert!, and to a lesser extent AlphaGalileo and the German-language Informationsdienst Wissenschaft. As explored in detail by Orduña-Malea and Costas (see Chapter 1 in this book), these platforms display press releases from paying organizations that conduct, publish or fund scientific research. During my fieldwork, SMC Germany editors did not have set routines for checking these platforms; instead, they browsed their webpages when they could afford to do so.

In addition to peer-reviewed publications, SMC Germany editors also use preprints, i.e., scientific texts awaiting a peer-reviewed publication process (Walker & Rocha da Silva, 2015), as a resource. At the start of the fieldwork, SMC Germany used preprints as an indicator of scientific issues that may become relevant in the

future. The SMC Lab has created a program that scans preprint databases for keywords relating to SMC Germany's main topics of interest in order to flag preprints with above-average download counts:

We wanted to see papers that we wouldn't see otherwise, but that could be relevant for the public, and there are distinct topics [that we look out for]. The idea was basically that interesting papers in research are perhaps marked, at least if they are very interesting and many people are interested in them, by the fact that they have a high download count early on. (Interview, editor-in-chief, January 2020)

Like in other science newsrooms (see Chapter 3 in this book, also Fleerackers et al., 2022), preprints became more relevant during the COVID-19 pandemic, as researchers began uploading new findings on the novel coronavirus on preprint databases before finishing the academic peer review and publication process (Fraser et al., 2020). Whilst this development allowed SMC Germany to stay on top of the latest insights, albeit unverified, it also meant that the organization could no longer rely on the time advantage of embargos, nor the preselection and quality assurance expected from peer-reviewed journals:

We had to change the way we did things [because] we didn't really stand a chance without an embargo. The corona studies were always released for direct publication. That is to say, they were sent out through the press offices, and of course they were immediately available to the journalists, who would write about them directly. So we just didn't have that kind of lead time anymore. (Interview, editor, October 2020)

SMC Germany also keeps a close eye on the public debate on science. To this end, an automated scan searches a press database with local, national, and international news media for keywords of the organization's main interests. Each morning, one of the SMC Germany editors takes on the rotating task of evaluating the results of the press scan. They summarize their findings, i.e., which media reported on a particular scientific issue, in a preformatted document that serves as the basis for the morning editorial meeting. Press monitoring helps editors keep track of scientific topics currently attracting media attention, which in turn informs decisions about timing potential broadcasts:

That's the core of it. We have built up a second observation radar. This is the so-called media monitoring. That means we look at what are public issues now and how do they develop over time? And when are the entry points for coverage where a scientific perspective can make a difference? (Interview, head of IDM department, January 2020)

Another source for observation are the press calendars of the German Press Agency (dpa) and those of German federal and local, and European political institutions. The former is monitored by means of a subscription service, whereas the latter are monitored manually by the editors themselves. These sources help the editorial staff to forecast which science and technology topics will be on the political agenda in the days to come, for example, as a result of new reports or policy advice documents being released. This particularly helps the editors working on climate and technology topics to gain an overview of their area of expertise, as the embargo e-mails and press releases tend to focus on research in medical and life sciences. Finally, SMC Germany is connected to other, international SMCs in the UK, Australia, and New Zealand via messenger tools.

5.2 Selection and filtering

Like science journalists in traditional newsrooms, the staff of SMC Germany selects the topics for its broadcasts (“stories”) according to several considerations. These journalistic, scientific, strategic, and organizational criteria are based on internalized notions about science and journalism (see e.g., Caple & Bednarek, 2016; Donsbach, 2004), expertise and explicit knowledge about the subject matter (Westlund & Ekström, 2020), and practical judgements based on SMC Germany’s capabilities and agenda.

5.2.1 Journalistic criteria

Issue selection depends in part on news factors, i.e., those criteria with which journalists determine the news value of a topic prior to its selection (Harcup & O’Neill, 2017). Studies on issue selection in science journalism show that conventional news factors like actuality, unexpectedness, and range of impact apply to science coverage as well, albeit with some particularities (Badenschier & Wormer, 2012). The most important explicit criteria for topic selection at SMC Germany is that all “stories” must concern a so-called “public issue.” Following observations of editorial meetings, chat discussions, and interviews with staff, determining whether a topic is a “public issue” involves a combined ascription of journalistic relevance, social relevance, and scientific relevance:

We don't do politics here and we're not an NGO or agency that passes on everything unfiltered, nor are we an agency *for* science, but we select what is relevant in the debate according to journalistic criteria, and who and what scientific expertise *should appear* in the debate. (Interview, head of IDM department, January 2020)

A topic is considered socially relevant when it has the potential to affect the lives of many people; when it is the current subject of public debate; when it is considered urgent; or in need of political decision-making. For new scientific findings, an important marker of social relevance is whether they are expected to have direct applicability:

[Editor 1] "Nature Catalysis published a study [Jie et al. 2020] about plastic waste which was treated with microwaves. They looked at what extensions and selectivity could be used to fragment this garbage and then convert it into hydrogen and fuels."

[Editor 2] "They only used small samples, though, so I'm not sure that would be a starting point right now. What's your impression?"

[Editor 3] "What does this fragmentation mean, are the parts then no longer harmful, do they stay around?"

[Deputy editor-in-chief] "Do we have any experts on this at all, dealing with exactly these chemical processes?"

[Editor 2] "I think it's interesting. I mean, there were these bacteria that ate a fingernail-sized piece of plastic before, and that got a lot of media coverage at the time. But I don't know at what point these newer techniques are ready to be used."

[Deputy editor-in-chief] "You can ask what phase the technology is in, so whether it's already close to application or not at all yet."

(Excerpt field note, editorial meeting, 7 October 2020).

Journalistic relevance is assessed by means of media attention, whether already evident or expected in the future. The editors assess whether issues are perennial, recurring, or one-off events. To objectify this, SMC Germany editors sometimes link their hunches to topic careers: visualized media attention curves (Ruß-Mohl, 1993). SMC Germany employs these to choose the best moment to intervene, and maximize the impact of its broadcasts. Despite these explicit criteria and prediction routines, the decision to select an issue is still decided based on journalistic intuition or "gut feeling" (Schultz, 2007): a learning process that is linked to professional experience:

The biggest thing I've learned, and I would say I'm not done yet, is to make the decision: Is this an issue we should jump on or not? How relevant is it to society? How relevant is it in general? Or how interesting is it to me because *I* find it exciting? That's the hardest part. I mean, all the techniques, all the craftsmanship, you learn that. You can always learn the craft. *But developing a feel for issues is the biggest challenge, and it still is a little bit.* (Interview, editor, January 2020)

It is interesting to note that the editors of SMC Germany explicitly exclude the news factor “astonishment” from its “public issue” criteria, which seems to be important in regular science newsrooms (Badenschier & Wormer, 2012, p. 78). By excluding this news factor, SMC Germany aims to distinguish itself as an organization that provides quality, curated science news, while minimizing the possibility that its content will be seen as entertaining and frivolous (“unseriös”).

5.2.2 Scientific criteria

To determine scientific relevance, the editors assess the novelty and credibility of scientific studies, as well as of scientific claims that are receiving attention in the public debate. To assess scientific novelty, the editors initially rely on their own explicit expertise:

I always think about what has the greatest informative value, what could you best write a story about, and how relevant it is. Sometimes, there are publications that highlight side issues. Or they only bring a smaller added value. Or they confirm existing knowledge or something like that. So for the fifth interesting cluster analysis, you kind of think ... We don't include every publication anymore. (Interview, editor, October 2020)

The editorial team assesses scientific credibility by looking at methodology, sample size, statistical analyses, and levels of evidence and verification. Here, double blind studies, a large sample size, statistical significance based on transparent inferences, meta reviews, and peer-reviewed publications are considered the most credible. This approach worked best for quantitative studies and medical research in particular. SMC Germany did not appear to have explicit criteria for determining the credibility of other types of research.

In addition, the editorial staff considers the academic standing of scientists who authored a publication or appeared as experts in the public debate, based on whether they have previously published on the subject matter. The perceived quality of the journal in which publications appear also matters. Studies published after peer review in international journals with high impact factors are considered most credible. It is interesting to witness that open access (OA) journals are perceived as less trustworthy than subscription-based journals:

There is the feeling, not with me, but with some in the editorial team, that [OA publications] are simply being pushed through and that there is no real peer-review process going on. [...] Peer review and openness are sometimes mixed up a bit, and some people just feel like this “open access” thing can't be good. It's too fast, that's why it's open. (Interview, editor, August 2020)

This belief is further fueled by the notion that scholars and research institutions could pay their way into OA publications. This seemed to conflate the phenomenon of predatory publishing (Grudniewicz et al., 2019) with the article processing charges that are common in OA publishing (Solomon & Björk, 2012). Being perceived as less trustworthy by science journalists may be an unexpected side effect of the shift towards open science in academia, which tends to be normatively linked to ideas of fairness, accessibility, and transparency (Taubert et al., 2019, pp. 5–7).

Finally, SMC Germany editors may select scientific issues because of a perceived lack of scientific credibility or quality. In case of doubt, the editorial staff will have the publication or its claims assessed by external experts and, should the concerns be justified, broadcast what the editors refer to as a “showstopper.” SMC Germany hereby aims to prevent journalistic media picking up claims that are exaggerated, wrong or potentially harmful. This happened during the fieldwork in response to a new study published in *Nature Energy* (Sovacool et al., 2020), which examined the relationship between nuclear energy and carbon emissions:

[Editor 1] “We discussed this study at some length. [SMC Lab employee] explained to us that the researchers did not find any significant reduction. So as we feared, the Bayerischer Rundfunk, for example, is now already reporting that nuclear energy is therefore of no use. *So that has gone a little bit wrong, especially if it is going to run in the dpa* [German Press Agency]. *I’m unhappy with that.*”

[Deputy editor in chief] “Today is Tuesday, if *dpa* is planning something for Thursday, can we still do something, somehow get the study assessed by experts?”

[Editor 2] “We may not make it. We can at least contact *dpa* and describe our concerns and support them with statistical interpretation. That way we don’t need to spam our journalists.”

(Excerpt fieldnote, editorial meeting, 6 October 2020)

5.2.3 Strategic criteria

The organization’s overall goals always weigh into SMC Germany topic selection process. An important criteria here is the extent to which a broadcast could make a difference (“einen Unterschied machen”) in the public debate. During the fieldwork, this was discussed in relation to important upcoming negotiations in the European parliament about agricultural spending, which was missed due to staff absence:

[Editor 1] “This is about a really big chunk of money. [...] Actually, it would be our task to be aware of this four weeks in advance *in order to explain to the journalists where to look*. I

don't see any concrete starting point for us now where scientists could contribute their expertise, the details of the negotiations are unclear so far.”

[Editor-in-chief] “Exactly that would be a question for scientists [...] Greenpeace is making statements and also various other actors, but so far no scientists. Of course, there are also economic and ecological aspects. *We could shed light on all of that with science!* [...] The week is not over yet. It would be good to hear what the *voice, no, the voices of science* have to say about this.”

[Editor 1] “I can think of some agricultural economists, I'll try to get people on the phone.”

[Editor-in-chief] “Yes. I see the problem that only lobbyists are heard, but the scientists are not. *We could change that, couldn't we?*”

(Excerpt field notes, editorial meeting, 21 October 2020)

5.2.4 Organizational criteria

Finally, if a topic meets the scientific, journalistic, and strategic criteria, the editorial staff examines whether reporting is feasible based on organizational capacity. The team's availability as well as the time window until broadcasting are both important considerations. Considering the small size of the editorial, limited availability due to illness, vacation or a high workload can have a strong impact on the issue selection process. The same applies to missing in-house expertise: topics outside of SMC Germany's thematic departments are unlikely to be reported on, despite gaining attention in media and society. Lastly, coverage may be canceled if an embargo period is too short, or if experts willing to provide statements or appear in a press briefing cannot be found in time.

5.3 Editing and Processing

In the third stage, the selected issues are transformed into news through summarizing, contacting expert sources, and formatting. At SMC Germany, these routines tend to overlap, as considering the relevance, a good angle and hook, the right timing and the right format for a given scientific issue is done through “collective sense-making” between editors as well as expert sources, which imbues topics with meaning (Brüggemann, 2014, p. 64; Cook, 1998).

5.3.1 Broadcasting formats

In 2020, the organization had several broadcasting formats, including “Rapid Reaction,” “Research in Context,” “Factsheet,” and “Science Response.” The choice

of a particular format is based on several factors. These include whether the issue originated in science or the public debate; whether there is scientific consensus or rapidly progressing insights; whether journalists are perceived to be in need of immediate, gradual or eventual orientation; and lastly, whether the issue can stand on its own or requires contextualization within larger scientific or societal developments. Finally, the editorial team considers the impact they want the broadcast to have, e.g., setting the journalistic agenda, debunking sensationalist claims, or providing comprehensive background information. In response to COVID-19, SMC Germany developed three new formats. These include “Virtual Press Briefings” for which editors invite high-level scientific experts and accredited journalists to discuss current scientific topics:

So that's why we've also ramped up these press briefings, because then we simply create a space where journalists can get their questions out, and they don't all have to call Prof. Drosten or anyone else individually. [...] *That was a point where we could really help the experts.* At the same time, journalists especially from smaller news media may fall behind [getting answers] from press offices, *but we were still able to offer them a platform to deliver their questions to the experts.* (Interview, editor, October 2020)

In addition, SMC Germany started the weekly “Corona Report,” featuring data visualizations and explanations of statistical terms, in response to the need for basic statistical literacy among journalists during the COVID-19 pandemic (see for example Nguyen et al. 2021). The editors also introduced the “Annotated Publication List” in which the editors summarized and classified new research, including preprints, based on credibility and relevance.

5.3.2 Expert statements

SMC Germany's broadcasts rely on expert statements provided by scientists, many of whom are listed in the organization's expert database. In accordance with the expert factors of competence, prominence, eloquence, accessibility and reliability, and media experience, as described by Nölleke (2013, p. 275), SMC Germany editors prefer experts who actively engage in research within their field of expertise, have published in international journals, and have no conflicts of interest. This means that experts from academic research institutions are preferred, though exceptions can be made for “stories” on energy and mobility, where some experts are affiliated with private enterprises. After working with a particular expert, the editors also take into consideration their ability to communicate clearly.

Once suitable experts have been identified, SMC Germany editors reach out to them with an e-mail summarizing the key points and relevance of the issue.

This e-mail often forms the basis for the later broadcast. Then, the editors formulate questions, asking the experts to evaluate scientific claims made in the public debate, to assess the methodology of scientific studies, and to consider the potential implications of new findings:

You have to make sure that your question is as broad as possible. We want to avoid statements that give a distorted view of what people in science think, or what science thinks. Because that [nuanced view] is what matters in the end. And that's not so easy, because we have a conflict of goals there. (Interview, editor, January 2020)

In general, it is important that more than one expert replies to SMC Germany's statement requests, and in the case of scientific publications, do so before the embargo falls:

The response rate of our experts is usually very high. And people [scientists] are resilient. They don't say, "Oh, my goodness, you again. Instead, they see the significance, they are convinced of it, and then they sit down and make these statements in their spare time, even though they are overworked. (Interview, head of IDM department, October 2020)

The editors use a content management system (CMS) to create the editorial product. All "stories" are received by accredited journalists as e-mail text. The e-mail begins with a note in bold indicating whether the content is "for immediate release" or "embargoed." Journalists are addressed as "Dear colleagues." The editors use the inverted pyramid style to convey the topic and its relevance. This is followed by the statements of the experts, which remain mostly unedited. Cooperating scientists are listed with their names, titles, and affiliations. The editors have different strategies for organizing the statements, sometimes by the order in which they were received, alphabetically by the experts, or by the main themes of the commentary.

5.4 Distribution

From an organizational perspective, SMC Germany does not have set deadlines based on printing or broadcasting times. After "stories" are ready for broadcasting, the editors determine the optimal timing by considering journalists' schedules and the current public debate, and by anticipating potential influential events, e.g., political calendars.

SMC Germany relies on digital media such as e-mail, web conferencing, online publishing, and social media to reach its audience. For embargoed material, editors release their content 24 hours prior to the embargo lift to allow journalists sufficient time to incorporate SMC Germany content into their reporting.

If additional expert statements arrive, editors include these in updated versions of the broadcasts. One day after the initial broadcast, SMC Germany makes all content, including video recordings and audio transcripts of press briefings, available on its website and publicly announces this via Twitter. As an alternative, the SMC Germany editors may choose to retweet an older “story” if a similar discussion is reemerging in the public debate.

Despite receiving requests for personalized content (Thurman, 2011), SMC Germany did not personalize its distribution to the interests of individual journalists or groups of journalists. The main reason given during the fieldwork was that it was technologically difficult to achieve. While this may have changed, the option still poses a challenge: on one hand, personalized science content could aid specialized science journalists to sort through topics more efficiently. On the other, it could hinder SMC Germany's efforts in placing science issues on the journalistic agenda, since not every registered journalist would see all content.

5.5 Interpretation and feedback

A final step is the evaluation of SMC Germany's publications for quality, working practices, and impact. The latter is assessed through a semi-automated process that searches German news sources for references to SMC Germany or its content. The scan includes titles, body text, and expert statements, which may have been fully or partially copied into news articles without crediting SMC Germany. After each broadcast, SMC Germany creates a news clipping, similar to those used in public relations (Dozier & Repper, 1992) that shows which news media have picked up expert statements. These are shared with the collaborating experts. Editorial meetings are an important setting for editors to discuss the more opaque impact of SMC Germany broadcasts. For example, editors may discuss whether the formats and timing of broadcasts were appropriate, and whether they appear to have influenced the overall quality of scientific reporting on a particular topic:

[Editor 1] “The story on microplastics in baby bottles [Li et al. 2020] got very wide coverage, including *Deutschlandfunk*, *AFP* and *dpa*, many using our experts but some without.”

[Editor 2] “The *NTV* app as well.”

[Editor 3] “*Spektrum* too.”

[Editor-in-chief] “Was it right to do something about it, Editor 2?”

[Editor 2] “I had first only read that the Australians [SMC Australia] had done something about it and thought oops, that's quite an issue. Especially because of the amount of plastic particles.”

[Editor-in-chief] “You find it [microplastic] more and more, and everywhere, so it's not really surprising. But we don't know what kind of impact it has. Now there is a study that says

particles can do something in the body but we don't know what exactly. But the amount is indeed surprising.”

[Editor 2] “The image “baby with bottle” just sticks. It wouldn't be wrong to report on it again. It's worth it in individual cases. Here I think it is.”

[Editor 1] “The experts also said that you don't automatically have to assume that it's mega harmful.”

[Editor-in-chief] “*It would be interesting to see whether that message is also taken up or whether they've only taken over the scandal. We'll have to do some reading into that.*”

(Excerpt field notes, editorial meeting, 20 October 2020)

In addition, editors try to identify potential gaps in their access and monitoring routines: what relevant issues were missed? Why were they missed, and should there be action taken to ensure that this doesn't happen again? Finally, SMC Germany also receives feedback from its audience, either in response to “stories”, or as the result of surveys sent out to ask journalists specific questions, e.g., which formats are most helpful for your work? In which ways do you use our content in your reporting?

6 Discussion

In each of the news production stages, SMC Germany's editors create knowledge according to certain “*rules, routines and institutionalized procedures*” (Ekström 2002, p. 260, original italics) that share many similarities with science journalism in the digital age (Dunwoody, 2021). These result in science stories that are specially curated for further dissemination through journalism. The literature on epistemic journalism typically divides the knowledge involved in newsmaking into explicit knowledge related to specific expertise, and implicit knowledge about news value (Westlund & Ekström, 2020, pp. 81–82). At SMC Germany, the distinction between these two types is not always clear: editors apply knowledge of scientific topics and the inner workings of science on the one hand, and knowledge of current media debates and the structures of journalism on the other. Explicit knowledge is important because editors are expected to be well-versed in their areas of scientific expertise in order to identify important developments and false claims. In this way, SMC Germany's routines resemble “knowledge-based journalism” (Donsbach, 2014; Patterson, 2013). In addition, the organization makes explicit what usually remains tacit, for example by applying concrete social, journalistic, and scientific relevance criteria to its topic selection routines. These routines assist SMC Germany with constructing objectivity and congruence in its decisions. However, as Ettema and Glasser (1998) have pointed out, the rules by

which journalists justify their epistemic practices are context dependent. For SMC Germany, communal sense-making processes, like editorial meetings, are important settings for negotiating the “contexts of justification” (Lyne, 1981, p. 148) that determine which science topics will be made into news as “public issues.”

Although SMC Germany is technically independent from cycles of regular journalism (Schlesinger, 1978), its routines follow a clear sequence in which it attempts to marry the temporal contradictions of science and journalism. SMC Germany’s routines facilitate “cooperation and collaboration” with actors from outside the newsroom (Westlund & Ekström, 2020, pp. 77–78), including scientific journals, media organizations, and scientists. In this assemblage, SMC Germany tries to identify “events” in the public debate on science, and in the process of scientific research, thereby giving science issues “a central organizing idea or storyline that provides meaning to an unfolding strip of events” (Gamson & Modigliani, 1987, p. 143). Scientific knowledge itself is, however, a representation of selected parts of reality, inherently incomplete, and subject to revision as new knowledge emerges (Bauer, 2017; Fleck, 1981, pp. 149–150). Since SMC Germany not only aims to anticipate but also create “events,” its broadcasts are timed to match the routines of the journalistic audience in order to achieve maximum agenda-setting (or blocking) effect in the public debate. The criteria of “public issue” helps editors negotiate long-term developments in science with current knowledge needs in society. However, SMC Germany’s routines rely in large part on relevance assignments constructed by actors within science, e.g. through press releases or embargoes. The expertise offered by collaborating scientists provides SMC Germany with “pre-established” facts (Ettema & Glasser, 1984, p. 10). These are afforded with high explanatory power in reference to science’s own professional routines for knowledge production, and provide the knowledge produced by SMC Germany with epistemic authority. As such, SMC Germany broadcasts present a version of reality that is informed by an understanding of science as a cultural and institutional practice capable of producing reliable knowledge (Gieryn, 1999). Its focus on large journals in the medical and life sciences, similar to regular science newsrooms, could furthermore serve to exacerbate rather than reduce medialization tendencies.

Through its routines, selection criteria, editorial formats and situated practices, SMC Germany thus produces a specific kind of knowledge that combines substantive and procedural scientific and journalistic knowledge. It is with this knowledge that SMC Germany assigns or negates relevance, quality and timeliness to scientific topics and the expertise of scientists, communicates with its scientific partners and journalistic public, and ultimately contributes to the construction of science news .

7 Conclusion

SMC Germany is considered an innovative organization (Buschow et al., 2022; Suhr et al., 2022) that fits the concept of “novel interfaces” (Guenther & Joubert, 2021) that have emerged in response to horizontal flows in science communication (Franzen, 2019). Its routines resemble those of traditional newsrooms with a division into “beats,” an editorial hierarchy, and news production practices. SMC Germany contributes to the construction of science news by limiting its scope of scientific topics and sources, assigning science issues with contextualized scientific, social, and journalistic relevance criteria (“public issue”), enriching its content with authoritative expertise, and timing its broadcasts with the intent to promote, alter or prevent journalistic coverage of scientific issues. Through these routines, SMC Germany produces knowledge that negotiates journalistic and scientific norms. The organization is able to take on “outsourced” practices of science journalism due to a combination of epistemic, practical, and organizational advantages. Its editors possess both implicit and explicit knowledge of scientific fields and the workings of science and journalism, can make use of automated processes, and have autonomy in editorial decisions without strong financial and temporal pressures. However, SMC Germany reflects some structures of regular science journalism, such as its narrow focus on medical, environmental, and technological research and its reliance on the embargo system, which may perpetuate tendencies of medialized and strategic science communication. Further research, such as content analyses comparing the output of newsrooms registered with SMC Germany to that of those not registered, is needed to gain insight into this.

8 Translations

All of the excerpts have been translated from the original German into English language with the help of the DeepL software.

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11 Data transparency

The ethnographic material is available for conditional reuse for scholarly purposes (Broer, 2021, 2022).

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