

Science & Technology Studies: Impact, Reader Engagement, and Expertise

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Abstract

The first edition of *Science & Technology Studies*, then named *Science Studies*, became available in 1988. Over the past 35 years, the journal has established itself as a prominent international publication, experiencing significant growth in publication volume, manuscript submissions, and readership. This paper commemorates these achievements and reflects on the journal's evolution. A key aspect of this exploration is our journal's role in the Open Access movement, which both enhances transparency and offers new tools for the analysis. The sections delve further into the topic of scholarly impact of STS, starting with a discussion of impact factor metrics followed by insights from our Editorial Team. The paper then utilizes the extensive archives of the journal and the capabilities of new tools to explore reader engagement with our publications. The paper concludes with a discussion of our way forward into the next years and decades.

Introduction

The inaugural issue of *Science & Technology Studies*, then titled *Science Studies*, was published in 1988. Established by the Society for Science Studies, now known as the Finnish Society for Science and Technology Studies, we now celebrate the journal's 35th anniversary, with 36 volumes successfully published.

The journal's initial mission was to disseminate research and discussions from Finland and other Nordic countries to an international audience, as the first editor-in-chief, Veronica Stolte-Heiskanen (1988), stated in the first issue. Over the past 35 years, the journal has established itself as a prominent international publication, with significant growth in publication volume, manuscript submissions, and readership. This paper not only commemorates these achievements but also reflects on the journal's evolution.

On the journal's 30th anniversary, the then-coordinating editor, Salla Sariola (2018), offered a retrospective of the journal's history. Her outline addressed the journal's transformation into an international journal in the early 2010s, the introduction of special theme issues and Open Access publishing, and its significant role as the house journal for EASST since 2012. Sariola's analysis also examined the geographical location and gender of contributing authors.

This paper will not duplicate the earlier effort, which was published only five years ago, though an update in 2028-2029 would be more than apposite to celebrate our 40th anniversary. Instead, it utilises the extensive archives of the journal and the capabilities of new tools to explore Science and Technology Studies (STS) as a field of knowledge production. A key factor in this



exploration is our journal's role in the Open Access movement, which both enhances transparency and enables unique analyses.

Moreover, the appraisal deliberately departs from focus on Journal Impact Factors (JIFs), which has become an increasingly popular and mainstream approach to academic publishing and evaluation (Vann, 2017). By leveraging the features of our Open Journal Systems (OJS) publishing platform and utilising insights from our international Editor Team's discussions, I rather address less conventional questions and challenge some of the standard narratives in academic evaluation. My paper concludes with a discussion of our way forward into the next years and decades.

Beyond Journal Impact Factors

The Journal Impact Factor (JIF) is calculated and published annually by Clarivate Analytics. It is a widely deployed metric for assessing journal citation counts. A JIF is determined by dividing two numbers; the number of citations in the current year to journal publications in the preceding two years; and the number of all the 'citable' articles published also in the preceding two years. It thus measures average citations: with an impact factor of 1.0, a journal's articles from one or two years ago have been cited once on average. With a JIF below 1.0, there has been less than one, and with a JIF of 3.0, on average of three citations. Some academic journals also publish their JIFs for the preceding five years, which demonstrates that the default two-year window may be experienced as too narrow in many cases to understand impact and performance adequately.

Katie Vann (2017), a former long-term managing editor of *Science, Technology, & Human Values* and *Engaging Science, Technology, and Society*, has provided a comprehensive discussion of the JIF, which is utilised and expanded in this section. To start with, we should note that *Science & Technology Studies* has a JIF, and similarly to Vann (2017), we acknowledge it as an important aspect in attracting scholarly attention. We, the editors, do not mean to undermine the value that publishing in journals with (high) JIFs may have for people's careers, despite the well-acknowledged limitations of this metric.

This paper discusses some of these impact factor limitations. As STS focuses on the social construction of knowledge, STS scholars are themselves well-equipped to understand the nuances of how metrics are calculated, to recognize methodological implications, which merit critical examination, and to scrutinize possibly detrimental effects.

Vann (2017) identifies several key implications with the JIF metric:

1. The JIF always focuses on citations within a specific time frame, i.e., the past two or five years, and it only includes citations from journals indexed in Clarivate's Web of Science.
2. In use, the JIF conflates citations with impact, since it assumes that the influence of scholarly texts can be understood primarily by their citation counts within a certain period.
3. This conflation can lead to an overestimation or underestimation of published papers' true value, as the JIF visibly depends on citation practices within certain fields of inquiry and whether these citations are included in the JIF calculation.

Although the JIF may be suitable for established, monodisciplinary fields, its application to a multifaceted and interdisciplinary field such as STS is thus not trivial. The JIF was initiated in the 1960s and 1970s, primarily as a tool for university librarians to determine journal purchases. When used in academic evaluation, its implication becomes different: it assumes a field in which an article's impact links directly to current interest, which is, furthermore, an interest well covered by other publications in recognised journals. An ideal of there being a state-of-the-art of scholarship, and well-recognised recent advancements, is both presupposed and performed by this metric. As will become clear below, this journal also endorses rigour and the advancement STS research, but assigning a simple measurement to it, applicable in different disciplines and fields, is not straightforward.

Indeed, there is a number of well-established issues in scholarly and policy discussions concerning JIFs. Among the best-known and most publicly visible statements is presented in the San Francisco Declaration on Research Assessment (DORA), first published in 2013 and currently signed by more than 2,000 organisations. The first recommendation of DORA to publishers is to:

Greatly reduce emphasis on the journal impact factor as a promotional tool, ideally by ceasing to promote the impact factor or by presenting the metric in the context of a variety of journal-based metrics (e.g., 5-year impact factor, EigenFactor, SCImago, h-index, editorial and publication times, etc.) that provide a richer view of journal performance. (DORA, 2013: n.p.)

Another similar example closer to the field STS is the Leiden Manifesto for Research Metrics, published as a comment in *Nature* (Hicks et al., 2015). By addressing what JIFs include and exclude in their calculations, it posits that a focus on publishing in high-impact journals can stifle the pluralism and societal relevance of research not automatically captured by the impact metrics.

These kinds of issues with publication metrics and understanding of performance are also clearly visible in STS. On a field as diverse and multivocal, in which scholars frequently reference work across the social sciences, humanities, and even the sciences and engineering disciplines, the JIF measurement approach can alter the understanding of what constitutes impactful scholarship (Vann, 2017). The JIF of this journal seems to be a case in point – it has tended to change visibly between years and past years were no reliable indicator for future developments.

Indeed, in a journal that publishes four issues a year normally with four research articles in each – special theme issues allow more papers – our JIF has been contingent to the publication and citation activity at a given time. Years with highly-cited research articles (Hyysalo et al., 2019) and special theme issues such as the “The many Modes of Citizen Science” (Kasperowski and Gullenberg 2019; Strassel, 2019; Schrögel and Kolleck, 2019) boost the JIF in the two years that follow and hence give visibility to our whole impact. Years where fewer highly-cited papers and issues are

published conversely underestimate this impact. These indicators thus introduce potential for false precision (Hicks et al., 2015) as the actual value of the publication activity does not lie in any middle point of these two ends and becomes challenging to interpret from this evidence.

There are, however, several other ways to approach the impact of scholarly texts. Vann (2017: 95) compellingly argues that the JIF “misconstrues how reading, and the texts STS scholars read, figure in the formation of STS expertise, and how that expertise is expressed in STS knowledge production”. This is where the tools provided by our Open Journal Systems (OJS) platform become invaluable and allow to explore impact in more nuanced ways. The subsequent sections will discuss this topic, starting with insights from our Editorial Team.

Contributions to the field: designations and challenges

Last year, the Editorial Team meeting of *S&TS* gathered to address a fundamental question regarding our desk-top selection practices: what falls within the journal’s scope, and how can we effectively recognize contributions to our field?

One key factor in asking this question are the volumes that the journal deals with. Since we started gathering publishing statistics after installing the Open Journal Systems (OJS) in 2016, *S&TS* has received on average a little over 200 article suggestions every year. Each of these suggested articles must be vetted carefully by desk-top review even before they can potentially enter peer review. The submission frequency grew dramatically after 2020: from having only some 50 submissions in the late 2010s, we received nearly 500 submissions in 2021 and 350 in 2022, though the figure has now lowered again to a little over 260 submissions received in 2023. Nevertheless, to use simple averaging, this situation means that more than one article is submitted into our publishing system every two days. A dedicated Screening Editor vets each of these papers and assigns them to individual Editors that then select some of them into peer review.

Our actual rejection rate has been consistently over 60% for the several past years. In concrete

terms, this means that two thirds of those papers that go into peer review will not be accepted for publication even after the peer review has been concluded.

The situation of having to deal with frequent submissions and an active pipeline while maintaining high publishing quality leads to broader questions about the nature of STS expertise and its recognition in a flagship journal. A selection of the Editorial Team, including Karen Kastenhofer, Alexandra Supper, and Mikko J. Virtanen, was hence tasked with addressing a key issue: *Can we safeguard the rigour of research papers submitted and published in the journal even more systematically, and if so, how?*

The team divided the question into two sub-themes. The first was defining *general* criteria for rigorous STS research and instruments to implement them in desk-top evaluation. The second concerned incentivising author positioning by means of outlining and discussing initial assumptions, choices and ramifications so as to allow for *approach- and text-specific* desk-top evaluation. This includes explicitly stating topics, specifying research designs, defining contexts, outlining processes, and adopting a reflective stance toward the conducted research, including the underlying assumptions and forms of knowledge (see also Silvast & Virtanen, 2023; Lippert & Mewes, 2021; Hyysalo et al., 2019).

The team thus recognized the complexities in defining rigour and the downsides of prescribing it, particularly in a diverse, evolving, and heterodox field like STS. Thinking about these issues, knowledge and experience are qualities that editorial engagement and peer review can bring to bear. Yet, while the insights of seasoned researchers are vital, we should not risk stalling the innovative contributions of newer STS scholars.

With that being said, there remains an imperative to uphold publishing quality and fit of papers with our journal and community. We emphasise the need for STS contributions that resonate with a broader audience and steer clear of scholarly provincialism. Consequently, we warmly welcome contributions that extend beyond case studies and enrich wider STS scholarship—whether in

conceptual, methodological, empirical, research ethical, or a combined manner.

To address this need concretely, the idea of a formal, separate category for theoretical essays was also debated. Concerns were raised that a separate category might diminish the theoretical depth perceived in all other articles and hence reify a difference between ‘empirical’ and ‘conceptual’ research at the level of categories. Indeed, as we demonstrate below, our readers most typically engage with papers that do not fit neatly into this dichotomy either but pursue new concepts and empirics at the same time. Therefore, rather than introducing new categories as solution, we rather advocate for diverse contributions—theoretical, conceptual, and methodological—across all types of articles.

Lastly, an essential aspect of our professional role as editors involves adhering to ethical standards. As per the guidelines of the Committee on Publication Ethics (COPE), an organisation comprising editors, publishers, universities, and research institutes, it is of paramount importance to have clear definitions and processes for promoting integrity in research and publication activities, including authorship, conflict of interests, peer review processes, and beyond (COPE, 2022). Our journal will be actively updating its relating policies in 2024.

Understanding STS readers

The Open Journal Systems (OJS) platform offers a unique glimpse into reader engagement with our publications through its comprehensive statistics. OJS not only tracks the number of downloads for each article but also records our self-registered readers.

At the time of this writing, *S&TS* has 3,239 registered users on the OJS platform, 1,043 of them self-designated as readers. Site usage data shows how all of our site visitors – including but not limited to the registered users – use the journal and when. For instance, during December 2023, we observed normal daily views of abstracts ranging from 120 to 500, while full-text reads varied between 80 to 250 (a notable dip in readership occurred during the Christmas period, which we see in a positive light). The release of a new issue mid-month typi-

cally results in a surge, with abstract views almost doubling to 900 five days after the release of the December issue, and full text downloads also increasing albeit at a more moderate pace. This pattern underscores our readers' anticipation of and engagement with each new journal issue.

Figure 1 displays the broader trajectory of readership starting from when we began collecting OJS statistics in 2016. It demonstrates a steadily raising trendline of growing readership. To take an example, during November 2016, the journal boasted 860 abstract views, which dramatically increased to 9,314 by November 2023. Text readings have also seen a notable increase, suggesting that a large portion of our audience engages with the content, not just summaries. This upward trend persisted even through the pandemic years, highlighting the enduring interest in the journal.

We posit that a major factor in this growth is our adoption of the Diamond Open Access model, similarly to other pioneering journals like *Tecnoscienza – Italian Journal of Science & Technology Studies* (Coletta et al., 2022). This approach, where neither authors nor readers have costs for publishing or accessing content, and where articles are freely available under a Creative Commons licence, aligns with our commitment to open and accessible STS scholarship. We transitioned to Diamond Open Access in 2017 and our

subsequent listing in the Directory of Open Access Journals (DOAJ) happened in 2021 (Sariola, 2021). We owe the ability to maintain this model to the generous support from EASST and the Federation of Finnish Learned Societies through the Finnish Society for Science and Technology Studies.

While OJS does not offer detailed demographics of our users, it does reveal their reading preferences. This behavioural data helps address questions raised by Vann (2017) regarding the impact of STS and the concerns about research rigour discussed above.

The most-read papers, as shown in Table 1, offer insights into the readership and interest. Although STS is often associated with detailed case studies, the most frequently read articles tend to be rather theoretical, methodological, or a mix of both (Hyysalo et al., 2019). These papers present varieties of knowledge bases and evidence and their content is empirical as well. Nevertheless, I would argue that a key contribution lies in their conceptual themes that broaden up notions of science and technology from an STS standpoint. These themes are heterogeneous and include citizen science (Strasser et al., 2019), the social construction of ignorance (Pinto, 2017), interdisciplinarity (Balmer et al., 2015), Actor-Network Theory in urbanities (Blok, 2013), public participation (Schrögel and Kolleck, 2019), future expectations (Brown, 2003), and even the

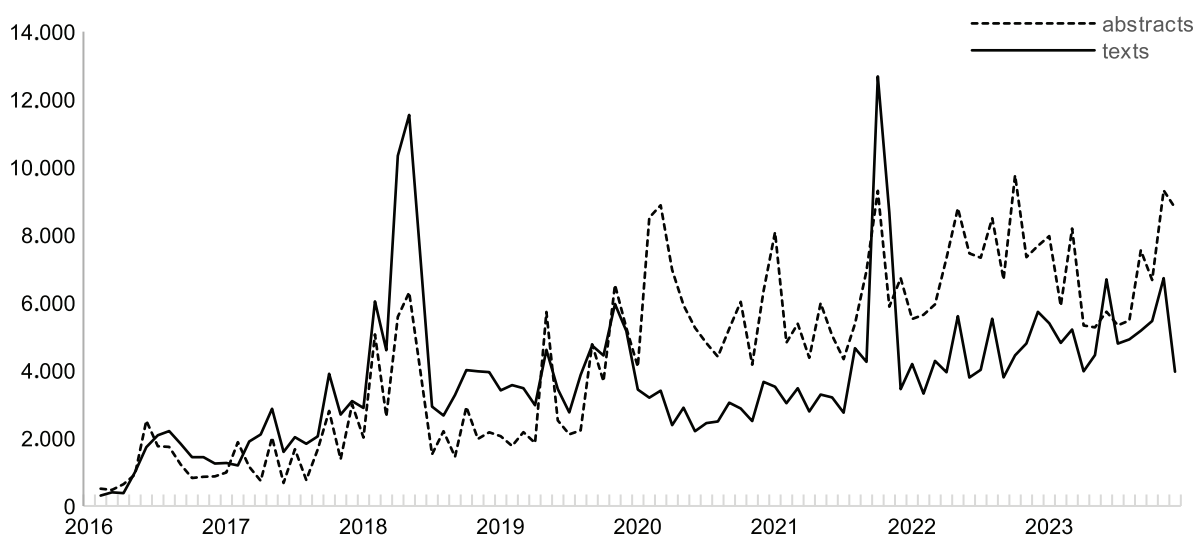


Figure 1. Number of monthly abstract views and article file views in *Science & Technology Studies*, 1 February 2016 – 31 December 2023. Source: S&TS Open Journal Systems Articles statistics, 21 January 2024.

relationship between STS and design thinking (Moore and Karvonen, 2008). This selection of reading indicates a strong and broad interest of our audience in conceptual and methodological innovation.

Additionally, and interestingly, book reviews, particularly those of works by Haraway and Latour, have also gathered significant readership. They have done this despite their low citation rates, underscoring a further disconnect between citation frequency and actual impact (Vann, 2017). This finding puts positive light to the role of book reviews in scholarly discussions. Two scholars from the Finnish *Historical Journal* have expressed this important role:

Discussing research is a key part of scientific activity. Book reviews form hence a very important element of scientific writing. They make research visible and inform colleagues about what is happening in the field, they tie scientific debates together, help relate emerging ideas in research and, at their best, offer a variety of tips and perspectives for further reflection. The evaluation of new literature in any field is therefore a vital service to the rest of the scientific community. (Roitto and Laine-Frigren, 2020: 356, translation by the author.)

But other kinds of publications in the system also lack a clear correspondence between the number of citations and the frequency of reads. Not all

Table 1. The most frequently read papers from *Science & Technology Studies*, 1 February 2016 – 31 December 2023. *Source:* S&TS Open Journal Systems Articles statistics, 18 January 2024.

*: the databases used include Google Scholar (GS), Scopus, and Web of Science (WoS) for the broadest possible coverage of citations. S&TS was not indexed in Scopus before 2012 and in Web of Science before 2015. S&TS book reviews are not indexed by Scopus.

Paper	Type	Abstract views	Text views	Total views	Times cited*
Strasser et al. (2019) 'Citizen Science'? Rethinking Science and Public Participation	Research paper	8,737	4,884	13,621	393 (GS), 207 (Scopus), 52 (WoS)
Hyysalo et al. (2019) Method Matters in the Social Study of Technology: Investigating the Biographies of Artifacts and Practices	Research papers	5,499	2,516	8,015	69 (GS), 31 (Scopus), 22 (WoS)
Kenney (2017) Review of Donna Haraway (2016) <i>Staying with the Trouble: Making Kin in the Chthulucene</i>	Book review	1,564	6,372	7,936	8 (GS), 4 (WoS)
Langlais (2006) Review of Bruno Latour (2005) <i>Reassembling the Social: An Introduction to Actor-Network-Theory</i>	Book review	362	5,963	6,325	3 (GS)
Pinto (2017) To Know or Better Not to: Agnotology and the Social Construction of Ignorance in Commercially Driven Research	Research article	3,450	2,748	6,198	49 (GS), 24 (Scopus), 22 (WoS)
Balmer et al. (2015) Taking Roles in Interdisciplinary Collaborations: Reflections on Working in Post-ELSI Spaces in the UK Synthetic Biology Community	Research article	3,595	2,106	5,701	170 (GS), 92 (Scopus), 79 (WoS)
Blok (2013) Urban Green Assemblages: An ANT View on Sustainable City Building Projects	Research article	2,503	3,155	5,658	97 (GS), 41 (Scopus)
Schrögel and Kolleck (2019) The Many Faces of Participation in Science: Literature Review and Proposal for a Three-Dimensional Framework	Research article	3,169	2,161	5,330	77 (GS), 39 (Scopus), 66 (WoS)
Moore and Karvonen (2008) Sustainable Architecture in Context: STS and Design Thinking	Research article	2,704	2,987	5,061	67 (GS)
Brown (2003) Hope Against Hype - Accountability in Biopasts, Presents and Futures	Research article	2,898	2,093	4,991	689 (GS)

highly cited papers feature frequent reads at our OJS platform, though it bears stating that the statistics here do not capture readers in other places such as ResearchGate or Academia.edu or any parallel publication platforms of universities.

The chronological distribution of the most popular papers is also noteworthy. Despite the earlier articles being out there for reading for a longer time, the majority of the most-read papers in Table 1 were published after 2012, with none predating 2003. More than half of these papers were published even in or after 2015, with three from 2019, suggesting that our readership is keenly interested in contemporary scholarship.

Overall, the articles attracting the most attention from our readers seem to be those that push the boundaries of traditional STS debates and introduce new ideas and methodologies. This interpretation reinforces the importance of our editorial discussions on how to best evaluate theoretical, methodological, and empirical rigour in submissions while not too fervently 'mainstreaming' STS publications. We thus eagerly anticipate future submissions that will continue to advance the field in these directions!

Conclusions

The journey of the *Science & Technology Studies (S&TS)* journal over the past 35 years reflects upon the evolution of the whole field of Science and Technology Studies (STS). From its beginnings as a regional Nordic and Finnish publication that aimed for an international audience in late the 1980s, the journal has grown into an internationally recognized scholarly platform. It has become an increasingly important channel that has a specific part in the ecosystem of STS publishing worldwide and that upholds specific publishing values in doing so. Our successful transitioning to the Diamond Open Access model and the adoption of tools like the Open Journal Systems (OJS) have broadened the readership and enhanced the

dissemination of knowledge, as this editorial has also demonstrated.

To fully capture this wide impact of scholarly work, traditional metrics such as JIFs have clear complexities especially in an interdisciplinary field like STS. A more nuanced understanding of 'impact' is necessary to understand our field and its evolution. Fortunately, there are many ways to move beyond citation counts and acknowledge the diverse ways in which STS scholarship informs and shapes scholarly discussions. In this editorial, the readership of STS papers was utilised as a specific and underutilised source of evidence. The data from the OJS revealed the most-read papers and their content and showed the community's enduring interest for theoretical and methodological advancements in our field.

These insights are not just concerned with discussing our editorial directions, though they do have several bearings on what those directions are like and how they may evolve. The arguments here could serve as a guidepost for scholars seeking to make meaningful contributions to the field and for triggering discussion in the broader STS community. As a journal, we believe that publishing is at the heart of designating what scholarly fields are and what they could become. We hence hope that both our authors and readers will think with us concerning the nature of STS contributions and the role of expertise, coupled with the need for rigour coupled with innovation and reflexivity in STS research.

As we move to 2024, the embracing of Open Access and the engagement with emerging scholarly needs and practices will be at the core of the *S&TS* journal's discussions and practices. In doing this, we hope to be part of setting an ambitious course for the future of STS scholarship.

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