

STS Between Centers and Peripheries: How Transnational are Leading STS Journals?

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Abstract

In the context of increasing internationalization of the science and technology studies (STS) field, and reflections on post-coloniality and provincialization of STS, we examine to what extent a set of twelve leading journals of the field have published papers from different regions worldwide. In this exploratory work, based on information retrieved from the Web of Science for the period 2010–2019, we often use Latin America as an example, but reflect on peripheral regions of the field more broadly. Our findings show that the historical West-European–North-American centers of the field maintain their hegemony, dominating the discussions in leading journals. Some Latin American and East Asian countries gained some visibility in journals focused on scientometrics and science and technology (S&T) policy and innovation, whereas the journals specialized in the socio-anthropological studies of S&T are the less transnationalized. Our preliminary hypothesis to explain such sub-field variations is that these objects (scientific policy, innovation) and methods (scientometrics) seem to be more universal and consensual, facilitating transnationalization, while peripheral science, the preferred object of study for peripheral STS, has not attracted attention from leading journals. Emphasizing the relational character of centers and peripheries, we argue that the invisibilization of the academic production of certain regions of the world in leading journals *makes* this work peripheral.

Keywords

STS publications; STS transnationalization; leading journals; centers–peripheries

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Introduction

We propose to examine: to what extent—throughout the last decade—leading Science and Technology Studies (STS) journals published papers from different regions worldwide? The set of journals examined cover different areas of this field of study, and are all published in English, in Western Europe and North America, regions where STS was initially institutionalized and still maintain strong hegemony in the production of theoretical frameworks, and in the setting up research agendas.

By leading journals, we mean periodicals that enjoy wide recognition in the academic community (qualitative dimension), which usually correspond to some level of impact measured through citations (quantitative dimension). Leading journals are the more prestigious in the field, which have published some texts that are considered as benchmarks, and which have maintained a close link with the prominent scholars and institutions in the field. Not all leading journals act in the same way, seeking prestige or becoming gatekeepers as their main—or exclusive—goal. Some of them question these functions and think of ways to counteract these concentration effects, by means of promoting diversity. The latter, however, does not prevent attention from being disproportionately focused on them—as indicated by metrics such as impact factor or citiscore. Certainly, scholars from the global South and the global North do look beyond these journals; however leading journals value more highly (probably through their peer review mechanisms) references to most cited literature of the field, in great part published in those same publications. The internationalization of leading journals is not the only way to further fertilize the field, but it is undoubtedly a necessary one, given the agenda-setting and prestige-concentrating role they play.

Although our reflections include the peripheral regions of the field broadly, we often use our region, Latin America, as an example, since it gives us some hints to understand this phenomenon more comprehensively.¹ As in other places, scientific development in some Latin American countries has taken place for more than a century and has given rise to strong research traditions in the biomedical, physical, chemical and agricultural fields ([Saldaña 1996](#)). Starting in the late sixties, the region has also produced endogenous thinking on science, technology, politics and society, with the pioneering studies on what was called “Latin American Thought in Science, Technology and Development” ([Herrera \[1971\] 2015](#); [Sábato and Botana 1968](#)). From the nineties on, the STS field has expanded in several Latin American countries and undergone increasing institutionalization, including the inception of its own journals ([Kreimer and Vessuri 2018](#)).

Examining the distribution of publications from different regions in the world in leading STS journals is relevant for three context-specific reasons. First, STS communities from central countries are increasingly aware that their notion of “situated knowledge” was actually limited to the developed world. This is shown by the growing attention paid to “sciences from below” ([Harding 2008](#)), “post-colonial STS” ([Anderson 2017](#); [Harding 2011](#)) and, more recently, “provincializing STS” ([Chen 2017](#); [Law and Lin 2017](#)). These concepts directly refer to the centers-peripheries relationships, to ways of dominance and global

¹ Of course, we are aware that the “peripheral context” is far from being a homogeneous space. However, for the purpose of this analysis, the more important features regarding scientific publication are shared by several non-hegemonic regions.

inequality, and point out the epistemic loss it means to ignore those perspectives that emerged beyond the West.

Second, STS has been broadened worldwide in the last few decades, resulting in an increasing scientific production generated in new, non-hegemonic areas within the field. This is reflected, for example, in the expansion of the Society for Social Studies of Science's (4S) conferences and its growing internationalization. In ten years, between 2009 and 2019, the number of participants doubled, from 913 to 1,939. The Latin American delegation increased sixfold, and the Southern and Eastern Asia representation doubled. In Latin America, the ESOCITE conferences, the regional STS association meetings, grew from a few dozen participants in its first gathering (1995) to around 500 in the recent years (2018, 2021). Regional and national associations have also been formed in Asia and Africa, such as the Network for Science and Technologies Studies in Africa (STS-Africa), created in 2007 and the TransAsiaSTS Network, including South, East, and Southeast Asia, Australasia, and the Pacific, formed in 2018. Besides, there has been an increase in the number of STS university programs, meetings and publications worldwide.

Third, this growing global community is subject to similar pressures regarding scientific publications. For instance, either in Europe, Taiwan, or Colombia, researchers have to meet the requirements of national scientific policies and universities' evaluation procedures to internationalize their scientific production and to publish in scientific journals considered "of excellence" and "high-impact," usually corresponding to the leading journals of each area, edited in the most developed scientific centers and mostly published in English. Thus, a linguistic dimension is added to this issue for countries and regions where English is neither the national language nor systematically taught by the educational system. This creates new heterogeneities that cross the areas where the STS field has been institutionalized later, facilitating or constituting obstacles to make their publications in leading journals visible.

In this context, this article answers the following questions. To what extent STS leading journals are open to transnationalization, bringing visibility to the research done in different regions worldwide? What is the scope of participation of STS Latin American production in mainstream journals? Do publication data allow for hypotheses on the relationships between hegemonic regions of the field and the new areas where STS flourish? Do journals belonging to different STS subfields show diverse degrees of transnationalization?

To do so, we have examined the articles published during the last decade 2010–2019 in the following twelve scientific journals, mentioned from the oldest to the newest: *Technology and Culture*; *Minerva*; *Research Policy*; *Social Studies of Science*; *Science and Public Policy*; *Science, Technology and Human Values*; *Scientometrics*; *Science as Culture*; *Science and Technology Studies*; *Research Evaluation*; *Public Understanding of Science* and *Engaging Science, Technology, and Society*.

This is an exploratory work, given the scarce previous studies on this topic (for Latin America see [De Filippo 2014](#); [De Filippo and Levin 2017](#); for a set of journals, [van den Besselaar 2000, 2001](#); for the science communication subfield, [Gerber et al. 2020](#)), and limited to some academic journals, while recognizing that a thorough study on STS transnationalization should include a larger set of journals as well as books, which are relevant in the field ([Martin et al. 2012](#)). On these bases, we hope that our work can raise some hypotheses for future research. Additionally, it can be viewed as a reflexive exercise, as we are dealing with our own field (STS) and our own region (Latin America).

The structure of the article is the following: in the first section, we discuss some trends and effects of the scientific evaluation practices on the publications' dynamics and their internationalization, as well as the aspects related to the use of English as the dominant scientific language. In the second section, we present the methodology. We show the results in the third one, and discuss, in the fourth section, some findings and draw up some hypotheses. Finally, we end this paper with some final considerations.

Publishing in STS Journals

The role of scientific publications in the delimitation of scientific fields has been widely discussed. Through the peer review of manuscripts, not only knowledge is validated ([Chubin and Hackett 1990](#)) but also rules of access, exclusion, quality and relevance are demarcated ([Davyt and Velho 2000](#)). In the last decades, a management culture of science evaluation has developed ([Halffman and Radder 2015](#); [Sugimoto and Larivière 2018](#)), with researchers increasingly evaluated on the basis of bibliometric indicators ([Hicks et al. 2015](#); [Thelwall et al. 2015](#)). The dissemination of quantitative methods of evaluation responds to the expansion of the scientific activity; the emergence and sophistication of new publication and citation databases and increasingly complex indicators; and the extended culture of audits and rankings ([Grass et al. 2018](#); [Biagioli and Lippman 2020](#)).

This scientific evaluation model is currently in crisis and is being questioned in different spheres ([Invernizzi and Davyt 2019](#)). The intensified use of bibliometric indicators is under recurrent criticism for imposing a single, universal and abstract standard, that makes no distinction among scientific areas, research phases, methods, or countries with different levels of scientific development ([Bianco, Gras, and Sutz 2016](#); [DORA 2014](#); [Şengör 2014](#)). It is also criticized for the limited selection of journals that comprise the publications bases—most of them from central countries—due to the low representation of social sciences and the predominance of English language journals and books ([Hicks et al. 2015](#); [Thelwall et al. 2015](#)). The evaluation based on these databases implicitly adopts the mainstream literature in the central countries as a quality standard ([Halffman and Radder 2015](#)).

Scientific policies have increasingly put the emphasis on the internationalization of research and its outcomes, particularly publications. Research internationalization intensified together with globalization, resulting from the expansion of the scientific activity, the complexity and global scope of many research problems, the circulation of scientists, the reduced distance/time as a result of the technological progress, the availability of funding provided by central countries, and the internationalization of higher education ([Vessuri 2013](#); [Dubois, Gingras, and Rosental 2016](#)). In this context, countries such as China and India, moved to important positions in the global publications' rankings ([Tollefson 2018](#)).

The internationalization of science has developed on an uneven base in terms of infrastructure, resources and scientists, which, articulated with mechanisms of universalized evaluation, results in a reinforcement of asymmetries. These are observed in the organization of agendas, the differential abilities to address complex matters, and the possibilities of effectively using the knowledge locally produced ([Kreimer 2015](#)). As Feld and Kreimer ([2019](#)) argue, the structuring of a new international division of scientific work, with “subordinate research” shaded by “megascience,” limits the negotiation margins of the agenda, the possibility of providing significant conceptual input and, especially, of directing knowledge to local development.

The evaluation and internationalization policies highlight the linguistic dimension of the problem. For non-English speaking countries, and more noticeably in the social sciences, the hegemony of standard English in scientific communication constitutes a barrier that limits their research's visibility, whereas publications in the national languages are considered low-impact and, implicitly, of lower quality ([Hicks 2006](#); [Vessuri 2011](#)), and even “lost science” ([Dahler-Larsen 2018](#)). The command of the English language is a kind of linguistic imperialism, a *linguicism* that favors a language in relation to others, while assuring a social capital to the users of the dominant version of English ([Phillipson 2012](#)).

The use of English as a dominant scientific language covers epistemological aspects, because language models the way in which scientists perceive a problem and explain the world ([Keller 2017](#)). Renato Ortiz ([2004](#)) has shown the ways in which English has re-configured the social sciences: for example, the concept of globalization originated in English and has become an anglicism in several languages (e.g. *globalización* in Spanish, *globalização* in Portuguese). John Law and Annemarie Mol ([2020](#)) point out that the requirement to publish in English excludes certain ways of acting in the world, associated with other languages. That requirement affects the content itself of publications as non-native speakers necessarily have to use terms that carry a foreign intellectual background.

This results in a division of the scientific agendas between local topics (in some countries) that are presented as “universal” and prove to be of interest to mainstream journals, and local topics (in other countries) that remain circumscribed to national or regional publication spaces. A consequence is that publishing about matters that deviate from universalized discussions implies authors are required to persuade the journal about the relevance of their topic. The latter is frequently difficult (as Law and Mol ([ibid.](#)) have observed), because what happens at a laboratory in California is *a priori* of global concern; yet what happens at a laboratory in Hanoi or Montevideo must be made thoroughly “interesting” for the desired debates in mainstream journals.

Why have these publishing and evaluation practices become so pervasive and entrenched? From a political economy point of view it has been observed that academic journals operate within global publishing conglomerates (such as Elsevier, Springer, Sage, Taylor & Francis) that standardize practices, establish business models, and are articulated around similar publishing infrastructures (e.g. ScholarOne or EditorialManager). In this way, three trends can be observed simultaneously. First, an oligopolization of journals ([Larivière, Haustein, and Mongeon 2015](#)); second, an exponential increase in the costs of accessing scholarly literature, whether through subscriptions or article publication charges ([Budzinski et al. 2020](#)); and third, an increasing marginalization of regions and scholars who cannot cover these publication costs ([Babini 2020](#)). Powerful as they are, these trends are pitted against one that seeks full open access, with no payments from institutions or academics and, indirectly, little or no space for large global publishing groups. Often, these trends are framed within issues of social or epistemic injustice ([Albornoz, Okune, and Chan 2020](#)).

Methodology

Twelve scientific journals of the STS field were selected to be analyzed. This set is not intended to be thorough nor consensual, since the limits of the field are dynamic and vary across different national and regional contexts. Yet, it includes journals that have been instrumental for the historical configuration of the field, represent different approaches to the study of science and technology, and enjoy extensive prestige.

Eight of the journals considered coincide with the ones selected in some of the few available studies on publications in the STS field such as De Filippo (2014) and van den Besselaar (2000, 2001).² Six of them have been identified in the study by Martin et al. (2012) as journals that regularly cite core STS literature.³ Given the aim of this paper, we have only included what are considered leading journals, leaving aside journals published in English in peripheral regions, such as *Science, Technology and Society*, *East Asian STS and Tapuya: Latin American Science, Technology and Society*. In our future studies, comparative analysis with these publications will be carried out.

The journals examined (table 1)—hereinafter cited with their acronyms shown in the second column—were created between 1959 and 2015, including several pioneering STS publications. Eight of them have their origin in Europe and four of them in the United States. Regardless of their site of publication, nine journals define themselves as “international publications” while three of them do not inform readers about their geographical scope via their webpages. *SPP* is the only one that explicitly expresses its interest in research coming from both developed and developing countries.

Four journals are the official bodies of scientific associations: Society for Social Studies of Science (4S), European Association for the Study of Science and Technology (EASST), and Society for the History of Technology (SHOT). In terms of publishers, only two are published by professional societies (both of them with a subscription model of access) and are the only ones that offer full open access (no APCs for authors, or any cost to view/download the articles). Eight out of twelve journals are published by any of the big five global publishers, evidencing the aforementioned oligopolization (see table 2). This trend in particular needs further research, as it could be argued, based on this small sample, it seems that becoming a leading journal in a given field is usually associated with an agreement with one of the large publishing conglomerates.

² Those common eight journals are *Technology and Culture*; *Minerva*; *Research Policy*; *Social Studies of Science*; *Science, Technology and Human Values*, *Scientometrics*; *Research Evaluation*; and *Public Understanding of Science*.

³ Those are, in order of citation: *Social Studies of Science*; *Scientometrics*; *Science, Technology, and Human Values*; *Research Policy*; *Technology and Culture*; and *Minerva* (Martin et al. 2012, 1189).

Table 1. List and Characteristics of the Journals in the Sample. Source: Journals' webpages and Scimago Journal and Country Rank.

Journals	Acronym	Start date	Country of publication	Scientific Society	Explicit international dimension*	Focus
<i>Technology and Culture</i>	T&C	1959	United States	SHOT	"International and interdisciplinary. . ."	Social studies of S&T
<i>Minerva</i>	MIN	1962	Germany	No	"...equally focused on ... local as well as global issues."	Social studies of S&T
<i>Research Policy</i>	RP	1971	Netherlands	No	Nothing explicit.	S&T policy and innovation studies
<i>Social Studies of Science</i>	SSS	1971	United States	No	"...the leading international journal dealing with the crucial issues in the relationship between science and society."	Social studies of S&T
<i>Science and Public Policy</i>	SPP	1974	United Kingdom	No	"...covers all types of science and technology in both developed and developing countries."	S&T policy and innovation studies
<i>Science, Technology, and Human Values</i>	ST&HV	1976	United States	4S	"...international, interdisciplinary journal. . ."	Social studies of S&T
<i>Scientometrics</i>	SCI	1979	Netherlands	No	Nothing explicit.	Hybrid
<i>Science as Culture</i>	SasC	1987	United Kingdom	No	"...an international ... journal. . ."	Social studies of S&T
<i>Science and Technology Studies</i>	S&TS	1988	Finland	EASST and FASTS	"...in 1994 it re-oriented itself to become more global. ... changes that were made to its editorial board in 2012, which sought to reflect the global nature of STS."	Social studies of S&T
<i>Research Evaluation</i>	RE	1991	United Kingdom	No	"interdisciplinary peer-reviewed, international journal"	S&T policy and innovation studies
<i>Public Understanding of Science</i>	PUS	1992	United Kingdom	No	"...international and interdisciplinary journal. . ." "interrelationship between science and the public in the context of different societies."	Social studies of S&T
<i>Engaging Science, Technology and Society</i>	ESTS	2015	United States	4S	Nothing explicit.	Social studies of S&T

* As declared in the journals' webpages in August 2020.

Table 2. Publishers and Type of Access of the Journals. Source: Journals' Webpages.

Journal	Publisher	Access
<i>Technology & Culture</i>	Johns Hopkins University Press	Subscription by individuals via membership to SHoT Open access
<i>Minerva</i>	Springer	Gold open access (Access publication fee)
<i>Research Policy</i>	Elsevier	Gold open access (Access publication fee)
<i>Social Studies of Science</i>	SAGE	Gold open access (Access publication fee)
<i>Science and Public Policy</i>	Oxford University Press	Gold open access (Access publication fee)
<i>Science, Technology and Human Values</i>	SAGE	Subscription by individuals via membership to 4S Gold open access
<i>Scientometrics</i>	Springer	Gold open access (Access publication fee)
<i>Science as Culture</i>	Taylor & Francis	Gold open access (Access publication fee)
<i>Science & Technology Studies</i>	The Finnish Society for Science and Technology Studies	Full open access
<i>Research Evaluation</i>	Oxford University Press	Gold open access (Access publication fee)
<i>Public Understanding of Science</i>	SAGE	Gold open access (Access publication fee)
<i>Engaging Science, Technology and Society</i>	Society for Social Studies of Science	Full open access

Following previous work by Peter van den Besselaar (2000, 2001), the set includes journals with different thematic profiles to cover the range of topics that are part of STS. Eight journals focus on the social/anthropological dimensions of S&T—with one of them being particularly concerned with the history of S&T; three of them concentrate on scientific policy and innovation studies, and one on scientometrics. In van de Besselaar's (2001) classification, these categories correspond to the qualitative, application-oriented, and quantitative studies of S&T. Although these three areas of study have been much closer at the origins of the field, they started to differentiate into specific subfields in the eighties. As Loet Leydesdorff (1989, 334) put it, "As with most social sciences, the field of science and technology studies has reached to

maturity at the price of some division of labor between qualitative theorizing and quantitative studies.” Such a differentiation process also affected the policy and innovation studies, increasingly structured as another subfield (Martin 2016). This differentiation nonetheless does not imply rigid divisions, and particular configurations can be found in each regional context. For instance, Besselaar (2000) noted decreasing exchanges between qualitative and quantitative studies of S&T, while the quantitative studies policy studies maintained a fluid exchange. More than a decade later, Ben Martin et al. (2012) observed that core STS literature, despite its focus on the sociology of science, also included issues of policy and governance of S&T and quantitative studies of science. At the same time, their study showed that *Scientometrics*, a journal specialized in quantitative studies of science, profusely cited core STS literature. On the other hand Sally Wyatt et al. (2017) wrote a chapter in the last edition of “The Handbook of Science and Technology Studies” on the contribution of scientometrics to STS. Boundaries and flows have also been common between the social and historical studies of science and technology, as demonstrated by Peter Dear and Shiela Jasanoff (2010).

These movements are inherent to a field that, as Jasanoff (2010) once described, was formed as an island in a preexisting disciplinary archipelago. This image depicts the changing landscape of the field as well as helps to explain the influence of new “tectonic movements” creating new land connecting islands. Recently, scholars in the field of innovation studies have claimed the need to restore a more intensive exchange with the social studies of science to better respond to the social and environmental challenges of innovation (Williams 2019; Soete 2019). Moreover, the metaphor is also very appropriate to call attention to the diverse configurations adopted by the STS field in different regions, where varied disciplinary streams served as the basis for the new STS island. As our goal in this paper is to assess the openness of these journals to STS research carried out in different parts of the world, it is important to examine a set of journals that represent a comprehensive scope of STS research.

The analysis of the publications was carried out based on data retrieved in September 2020 from the Web of Science for the period 2010–2019.⁴ The *ESTS* journal was founded in 2015, and so the five-year period 2015–2019 was considered. This timeframe coincides with the increasing transnationalization of the STS field referred to in the introduction. As noted by Edward Hackett et al. (2017, 747), the STS scholarship, as in many other fields, was strongly concentrated in the United States and Western Europe, and “. . . only in the past ten years has a truly global STS community begun to emerge as conferences are held in non-Western countries and new regional STS journals are established.” The search was limited to the category “peer-reviewed articles,” excluding editorials, book reviews, comments, and other types of texts. The search was conducted using the software Rstudio (version 1.3.959), and the package Bibliometrix. Altogether, 7,621 articles were found.

The annual number of articles published by each journal is very diverse, as shown in table 4. The article was attributed to a certain country considering the author’s institution, and in the case of co-

⁴ All journals in the sample are also indexed in Scopus. Web of Science was preferred since it retrieved more complete information regarding authors and institutions with the software used. Note that there are no biases related to the publication database used since the journals were selected *a priori*.

authorship, the first or the corresponding author. For the classification by regions worldwide, we used the one from the World Bank: North America, Africa, Eastern Asia and Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and Northern Africa, South Asia.⁵

Results

The authors of the 7,621 articles published during the period under study belong to 87 countries. Despite this diversity, the leading journals remain attached to the central regions of the field ([table 3](#)). *MIN*, *PUS*, *RE*, *RP*, *SPP*, *S&TS*, *SasC* and *ST&HV* publish at least 50% of their articles by European authors. This percentage reaches 89% in *S&TS*, journal of the *European Association for the Study of Science and Technology*; *ESTS* is a journal much more North American in its content (61%), as well as *T&C* (57%), linked to the *Society for the History of Technology*. *SSS* divides 90% of its articles between Europe and North America. Only *SCI* has a significant representation of authors from other regions: although 43% come from European authors, 31% come from South-East Asia, mostly China, that contributes with 21% of the articles.

Outside the Euro-North American axis, Eastern Asia and Pacific is the only region that provides 10% of the articles to six journals in our sample. The negligible presence of authors from South Asia, Middle East and North Africa and Sub-Saharan Africa stands out. The portion of articles from Latin America and the Caribbean is relatively modest—compare, in the last row, with the region's contribution to total global publications—and unequal among the journals. Latin American authors have greater presence in *SPP* and *SCIE*, with 7% and 6% of the published articles.

We examined the distribution of publications differently in [table 4](#), highlighting the contribution of articles from countries outside the hegemonic centers of the STS field (USA, Canada, and Western Europe). *SCI* is not only a prolific journal in terms of number of articles (between five and ten times more than most of the others), but it shows a greater international diversity and greater balance among authors' origins. From the 70 countries represented with articles published by that journal, 51 are outside the hegemonic centers of the field (see [Annex 2](#)). *STHV*, *T&C*, and *S&TS* are journals with a very low representation of non-hegemonic countries, whereas *RP*, *SSS*, *SasC* and *ESTS* show low internationalization, with only 10% of its publications of such countries, reaching 16% in *MIN*.

Although with less intensity in *PUS* and *MIN*, the journals with a socio-anthropological profile within STS prove to be rarely open to the contributions from outside of the STS intellectual centers, compared to *SCI*, *SPP* or even *RE*. *RP* has also published articles from a wide range of countries, although less frequently than the other journals oriented towards S&T policy/innovation.

⁵ See <https://data.worldbank.org/country>. Accessed March 3, 2021.

Table 3. Publications by Journals and Regions (%) (2010–2019). Source: Web of Science, [World Bank](#).

Journals	East Asia and Pacific	Europe and Central Asia	Latin America and Caribbean	Middle East and North Africa	North America*	South Asia	Sub-Saharan Africa
<i>Engaging Science, Technology, and Society</i>	9%	30%	0%	0%	61%	0%	0%
<i>Minerva</i>	9%	60%	4%	0%	26%	0%	0%
<i>Public Understanding of Science</i>	12%	53%	1%	2%	30%	0%	1%
<i>Research Evaluation</i>	10%	64%	3%	1%	20%	0%	1%
<i>Research Policy</i>	10%	66%	1%	1%	21%	0%	1%
<i>Science and Public Policy</i>	10%	62%	7%	1%	18%	1%	2%
<i>Science and Technology Studies</i>	2%	89%	1%	0%	8%	0%	0%
<i>Science as Culture</i>	6%	61%	2%	0%	31%	0%	0%
<i>Scientometrics</i>	31%	43%	6%	3%	11%	4%	1%
<i>Social Studies of Science</i>	7%	47%	2%	1%	44%	0%	0%
<i>Science, Technology, & Human Values</i>	5%	51%	1%	1%	41%	0%	0%
<i>Technology and Culture</i>	5%	36%	1%	1%	57%	0%	1%
Region contribution to global scientific output**	34%	31%	4%	5%	19%	6%	1%

* In this classification “North America” is composed of the United States of America, Canada and Bermuda. Mexico is included in the “Latin America and the Caribbean” region.

** Contribution of the regions to global scientific publications in all areas. World Bank data is based on National Science Foundation’s Science and Engineering Indicators, 2018. The comparison between STS publications and publications in all areas is only indicative; not rigorous comparisons are possible given the different dynamics among scientific fields.

Table 4. Countries Represented in the Journals' Publications, and Relative Presence of Publications from Non-Hegemonic Countries within the STS Field* (2010–2019). Source: Web of Science.

Journals	Total n. of articles	n. of countries involved	n. of non-hegemonic countries	n. of articles from non-hegemonic countries	Percentage of articles from non-hegemonic countries	n. of LAC** countries	n. of articles from LAC**
<i>Engaging Science, Technology, & Society</i>	88	14	4	8	9%	0	0
<i>Minerva</i>	211	34	17	34	16%	6	9
<i>Public Understanding of Science</i>	622	39	21	112	18%	4	9
<i>Research Evaluation</i>	309	33	16	58	19%	4	10
<i>Research Policy</i>	1389	45	26	178	13%	6	17
<i>Science, Technology, & Human Values</i>	379	28	11	31	3%	3	4
<i>Science and Public Policy</i>	639	56	37	152	24%	7	44
<i>Science and Technology Studies</i>	124	21	6	7	6%	1	1
<i>Science as Culture</i>	230	26	11	22	10%	2	4
<i>Scientometrics</i>	2978	70	51	1548	52%	9	176
<i>Social Studies of Science</i>	366	28	12	36	10%	3	6
<i>Technology and Culture</i>	286	31	14	25	5%	1	2

* USA, Canada and Western European countries are considered hegemonic within the STS field; the rest of the countries are considered non-hegemonic in this classification.

** Latin America and the Caribbean.

SCI stands out as the journal that represented more Latin American countries; it published 62% of the total of articles from the region. SPP, RP and RE together comprise a quarter of Latin American publications.

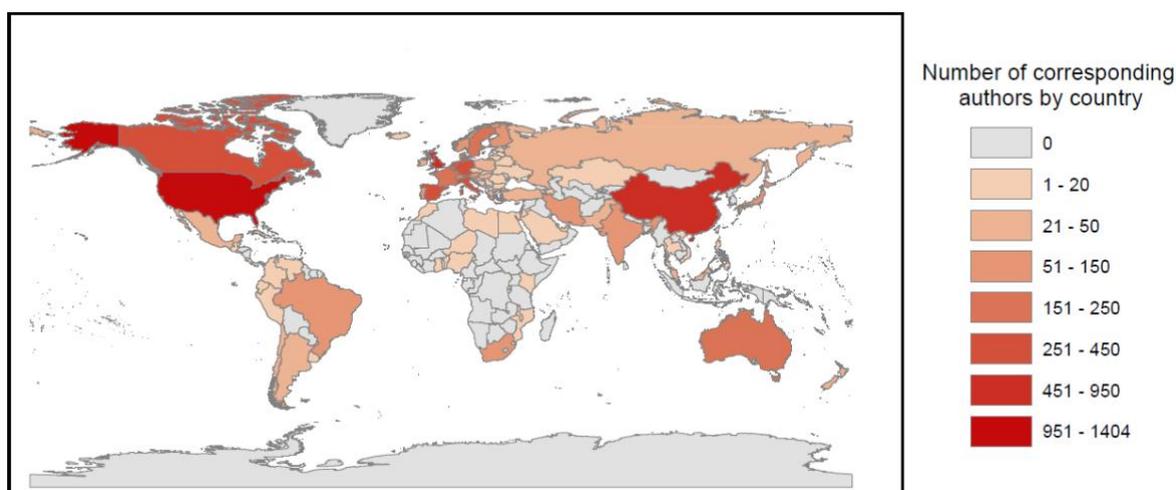
Among the journals with a socio-anthropological profile, *PUS* and *MIN* have published, each, less than one article per year, and the rest of them have included very few or no articles by Latin American authors.

It is worth mentioning that there has been an increase in the number of articles published from Latin America and the Caribbean in the leading journals. Their performance doubled between the first half of the analyzed decade, when 91 articles were published, to the second half, with 191, being the region with greater relative growth, far above the global growth (close to 20%). Within Latin America, Brazil contributes slightly more than a half of the number of articles. Together with Mexico, Argentina, and Chile, these four countries comprise more than 80% of the regional publications ([table 5](#)). The participation of these countries in STS publications follow a similar trend to the Latin American scientific production in general ([Feld and Kreimer 2019](#)).

Table 5. Number of Latin American and Caribbean Articles by Country in all Journals (2010–2019). Source: Web of Science.

Country	Number of articles (all journals)	Percentage within the Region
Brazil	143	50.7
Mexico	43	15.2
Argentina	30	10.6
Chile	22	7.8
Colombia	15	5.3
Cuba	9	3.2
Uruguay	7	2.5
Venezuela	4	1.4
Ecuador	3	1
Peru	3	1
Costa Rica	2	0.7
Guatemala	1	0.3
Total	282	100

[Figure 1](#) clearly shows the number of publications of the set of journals examined during the decade 2010–2019, by regions and countries (some additional data are shown in [table 7](#) and [annex 1a–b](#)). Three countries stand out due to their high production of articles: the United States (1404), the United Kingdom (855), and China (756). However, their participation in the STS field is very uneven: while the first two countries have papers distributed in almost all journals, China has 85% of its publications in *SCI*. In the following two intervals, we find Spain (428 articles), Germany (422), the Netherlands (382), Italy (318), Canada (261), France (195), Denmark (188), Australia (186) and Belgium (172). Within this group—Spain, unlike the rest—shows a strong concentration of publications in *SCI* (59%).



[Figure 1](#). Distribution of STS publications in all journals by country (2010–2019). Source: Web of Science.

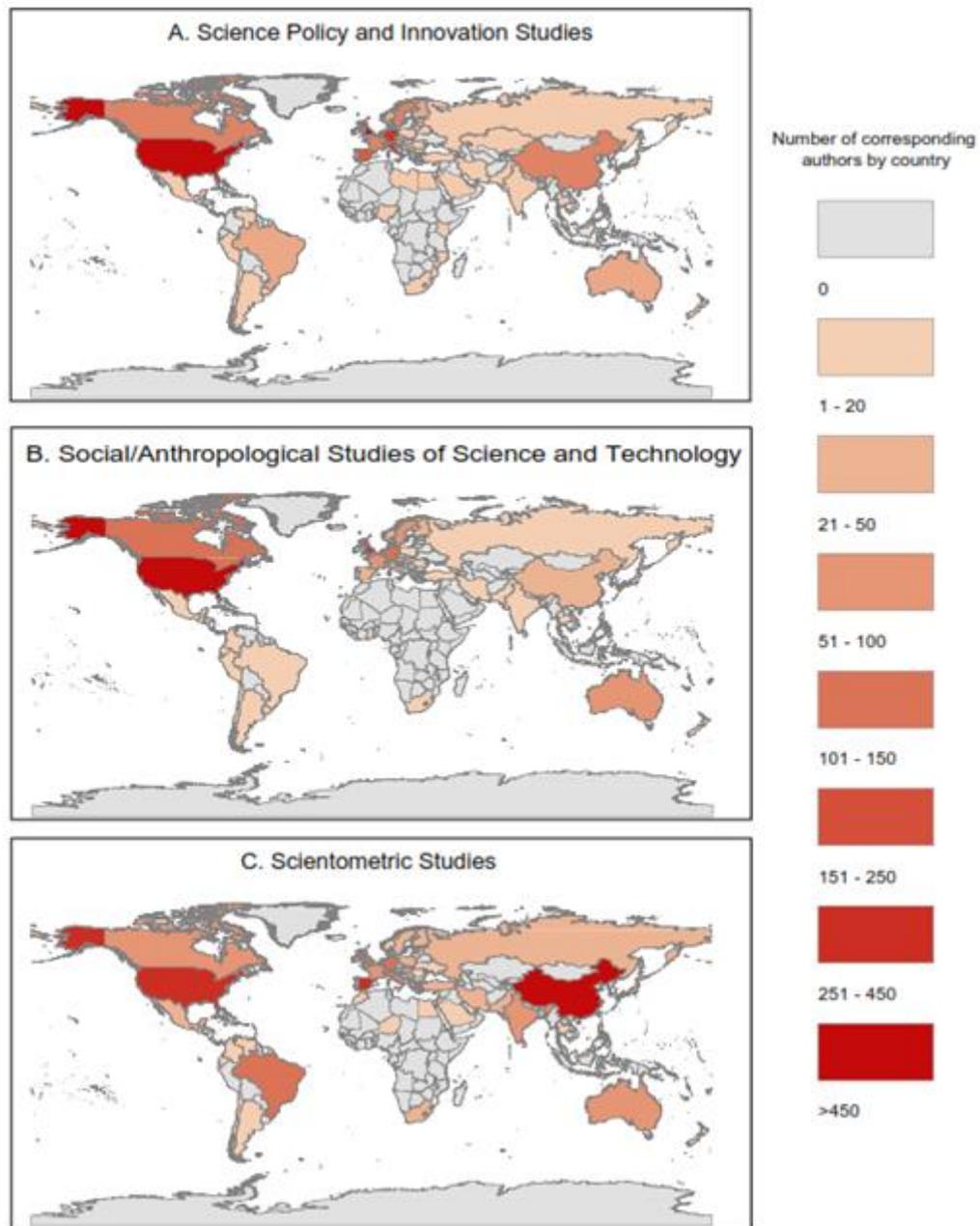
The space outside the Western-European-North-American hegemonic center of the field is heterogeneous. The map shows spaces that are completely empty. Most African countries, portions of Central and South Asia, and South America and the Caribbean do not have any articles in the journals examined. Also, the countries in Eastern Europe present a low contribution, similar to Latin America. Australia and South Korea are in a better position, with 186 and 178 articles respectively, although they have very different profiles: while Australian publications are distributed in several areas of the field, with 90% of the South Korean ones focus on the S&T policy/innovation and scientometrics. They are followed by Brazil (143 articles), Japan (116) and India (100) in the following band. The S&T/innovation and scientometrics studies constitute, respectively, 94%, 76%, and 95% of their publications. South Africa and Iran are placed at the bottom edge of the band with slightly more than 50 articles. Israel, Pakistan, Turkey, Malaysia, Singapore, Russia and New Zealand are in the 21–50 band, with a few other countries, while the rest corresponds to the lighter color. It is worth observing an integration trend of newcomer countries to the STS field through the area of S&T policy/innovation and scientometrics. From the last countries mentioned, only New Zealand and

Singapore have around 40 % of their articles in the socio-anthropological STS area, and Israel a quarter of them.⁶

[Figure 2a](#) shows the publications distribution of the journals that focus on S&T policy/innovation (*SPP*, *RP* and *RE*). The group that comprises the United States (392 articles) and the United Kingdom (313) stands out, together they represent 30% of the total number of articles with that profile; adding Germany, the Netherlands and Italy, that percentage rises to 52%. In the second group, China positions alongside other Western-European-North-American countries, such as Canada, Spain, France, and Sweden, that add another 20% of the scientific production. According to the number of articles published, the third group is composed of Brazil, Australia, and Japan, and then other countries with lower participation follow. Despite the predominance of the traditional centers of scientific production, these journals start giving visibility to works of a more diverse group of countries, though the number of papers is still low.

[Figure 2b](#) shows that the concentration in a few countries is much more significant in the journals specialized in the socio-anthropological STS (*MIN*, *ESTS*, *PUS*, *ST&HV*, *SSS*, *T&C*, *S&TS*, *SasC*). The United States and the United Kingdom represent 32% (742) and 18% (425), respectively. The Netherlands, Canada, and Germany join them with more than 100 articles each, comprising all together 15% of the total publications. Collectively, these countries hegemonize this area of the field, with 65% of the publications. Outside the Western-European-North-American axis, only Australia stands out, with 72 articles in the aforementioned period.

⁶ The percentage of articles in journals on S&T policy/innovation and scientometrics is the following: Southern Africa, 87%; Iran, 98%; Israel 74%; Pakistan, 97%; Turkey, 97%; Malaysia, 92%; Singapore, 58%; Russia, 87% and New Zealand, 54%.



[Figure 2a](#). Distribution of publications of the journals that focus on S&T policy/innovation (*SPP*, *RP* and *RE*), by country (2010–2019). Source: Web of Science. [Figure 2b](#). Distribution of publications of the journals that focus on socio-anthropological STS (*MIN*, *ESTS*, *PUS*, *ST&HV*, *SSS*, *T&C*, *S&TS*, *SasC*), by country (2010–2019). Source: Web of Science. [Figure 2c](#). Distribution of publications of the journal *Scientometrics* (*SCIE*), by country (2010–2019). Source: Web of Science.

[Figure 2c](#) corresponds to the journal *Scientometrics* (SCIE), where the distribution is more balanced. China leads the publications widely, with 21%, against 9% belonging to the United States and 8% to Spain. Korea contributes with the same share (4%) as Germany, Italy and the United Kingdom, whereas Brazil and India have 3% each. A group of countries, including Iran, Malaysia, Mexico, Pakistan, Turkey, and South Africa, have more than 30 articles published. [Table 6](#) and [Annex 1a–b](#) and [Annex 2](#) show more details of the *Scientometrics* case. This journal stands out due to the number of articles published, its greater geographical scope and because it is the main entrance to the STS field for several countries. It is noticeable that its presence is relatively stronger in non-hegemonic regions of the field: it constitutes almost 90% of the publications in the South of Asia, almost 70% in the East Asia and Pacific, and more than 60% in the Middle East and North of Africa and in Latin America and the Caribbean. Meanwhile, it only represents one-fifth of the North American publications and one-third of the European ones. Moreover, its importance in Europe is led by Spain, which, in general, is not a leading country regarding publications, but has some renowned research centers in scientometrics.

Table 6. Number of Articles Published in all Journals, and Share of *Scientometrics*' Articles, by Region (2010–2019). Source: Web of Science.

Regions	n. of articles in all journals (%)	n. of articles in <i>Scientometrics</i> (% of total)	% <i>Scientometrics</i> articles in regions' publications
Europe and Central Asia	3,991 (52)	1,281 (43)	32.1
East Asia and Pacific	1,347 (18)	935 (31)	69.4
North America	1,665 (22)	340 (11)	20.4
Latin America and the Caribbean	282 (4)	176 (6)	62.4
South Asia	139 (2)	125 (4)	89.9
Middle East and North Africa	131 (2)	86 (3)	65.6
Sub-Saharan Africa	66 (1)	35 (1)	53.0
Total	7,621 (100)	2,978 (100)	39.1

Table 7. Publications of Top 20 Countries According to the Profile of the Journals. Source: Web of Science.

Countries	Country total publications	Science Policy and Innovation		Social Studies of S&T		Scientometrics	
		n. articles	% of country publications	n. articles	% of country publications	n. articles	% of country publications
United States	1,404	392	27.9	742	52.8	270	19.2
United Kingdom	855	313	36.6	425	49.7	117	13.7
China	756	88	11.6	29	3.8	639	84.5
Spain	428	134	31.3	42	9.8	252	58.9
Germany	422	181	42.9	107	25.4	134	31.8
Netherlands	382	170	44.5	121	31.7	91	23.8
Italy	318	164	51.6	25	7.9	129	40.6
Canada	261	79	30.3	112	42.9	70	26.8
Sweden	212	90	42.5	73	34.4	49	23.1
France	195	73	37.4	71	36.4	51	26.2
Denmark	188	69	36.7	90	47.9	29	15.4
Australia	186	43	23.1	72	38.7	71	38.2
Korea	178	50	28.1	17	9.6	111	62.4
Belgium	172	53	30.8	22	12.8	97	56.4
Brazil	143	33	23.1	8	5.6	102	71.3
Switzerland	136	69	50.7	39	28.7	28	20.6
Japan	116	29	25.0	27	23.3	60	51.7
Norway	112	49	43.8	44	39.3	19	17.0
India	100	3	3.0	5	5.0	92	92
Finland	98	35	35.7	40	40.8	23	23.5

A complementary analysis results from examining the profile of publications of each country. [Table 7](#) shows the 20 countries with most publications in all journals. The United States, the United Kingdom, Denmark, Canada, and Finland are specialized in publications on socio-anthropological STS. Italy, Switzerland, Germany, the Netherlands, and Sweden turn to S&T policy and innovation, whereas Norway and France move through both fields with similar intensity. China, India, Spain, Brazil, Korea, Belgium, and Japan focus their publications on scientometrics studies. Australian papers are distributed between the latter and the socio-anthropological studies. Whereas the central countries, even having specializations or different emphasis among areas, tend to cover the three thematic profiles, the non-hegemonic ones have a greater presence in the area of scientometrics and in the S&T policy/innovation studies.

Discussion

We started by asking to what extent STS leading journals have transnationalized, publishing studies carried out outside the Western-European-North-American axis. The answer is that the historical centers of the field maintain their hegemony, dominating, therefore, the research agendas, the discussions, the conceptual formulations, and the empirical cases presented in the articles. We could talk about a centers-peripheries relationship in STS that, far from over, is reproduced with current publication practices. However, it is necessary to qualify that relationship better. The data presented in this paper, show that the relationship between centers and peripheries not only has structural elements that endure but also dynamic elements whose fluctuation requires explanations

We identified both some reconstructions of the centers and movements in the peripheries of the field. Although the dominance of the United States, the United Kingdom, the Netherlands, and Germany is maintained in the publications, other references emerge, varying according to the STS area under consideration. As in other fields of knowledge, the total production of China increased dramatically, although focused on scientometrics. Several countries of East Asia and Latin America opened-up spaces in the areas of scientometrics and S&T policy and innovation, whereas Australia did it in socio-anthropological STS. Meanwhile, a vast peripheral space remains invisible in the leading journals.

The reduced presence of the peripheries in these publications can be explained by two set of causes: on the one hand, because of a relative historical fragility of peripheral STS, even though some regional STS scientific communities have strengthened in recent years. On the other hand, it is the result of the ways in which centers and peripheries are co-produced. Peripheries have their own dynamic in the STS field, materialized, as already mentioned, in academic courses, associations, publications and conferences in Latin America, Asia, and Africa. Some of these regions produced their own discussions regarding this matter, even before joining mainstream STS studies in the 1980s and '90s, based on non-constructivist conceptual matrices: for instance, Latin America in the '60s and '70s, focused on science policy, on technological autonomy and on the relationship between science and social change, while India did so in the '70s and '80s, encouraged by strong social movements and their criticism to the post-colonial modernizing project.

We then looked into whether there exist some regularities in such publications that allow us to hypothesize about the relationships between the hegemonic regions of the field and the peripheral spaces where STS flourish. Our research shows that STS does not reproduce *pari passu* the relationship between centers and peripheries of "hard sciences," the object of study that concentrated a large part of STS research, and this relationship is not static either: it suffices, as an example, highlight the meteoric projection of China

in several scientific domains. Those countries in central scientific positions are distinguished by their capacity not only to design the research agendas, but also to apply the knowledge produced. In the peripheral regions, such as Latin America, the scientific agendas of the center are assumed, but there exist systematic failures to use the results, whether because they do not meet their needs or because of lack of technological or industrial capabilities ([Kreimer and Thomas 2006](#)).

What happens in the STS field? There is a clear difference between the countries that produce STS reflections about central science and the ones that make them about peripheral science. In other words, the object of study of the peripheral STS is, in itself, peripheral, and that condition is translated into a weak presence of the STS—of several regions worldwide—in leading journals.⁷ Part of this production is published in journals outside the central circuits, and in the case of Latin America, in Spanish, or Portuguese. However, this deepens its peripherality not only in relation to the most dynamic centers (that usually ignore this production), but also in relation to other peripheral contexts that cannot read these languages and, therefore, know and share research findings. Certainly, it is necessary to investigate whether this happens because the topics linked to the peripheral science are not of interest to the leading journals, or because the discussion locus is not there—but in the regions of origin themselves.

Although it certainly demands further research, the previous hypothesis proves to be plausible when examining the different center–periphery dynamics according to the specialization areas of the journals—an aspect that contributes to answering our question regarding *possible different transnationalization paths among mainstream journals*. The participation of the peripheries varies considerably according to the journals' profile. Those specializing in scientometrics and scientific policy and innovation are much more open to contributions of a comprehensive group of non–hegemonic countries than the socio–anthropological STS journals. We argue that this unequal dynamic is explained by the different objects of study and methodological resources involved.

The well–defined, standardized, and considerably consensual scientometrics techniques, as well as the generalized use of the same databases, which are increasingly accessible from institutions in peripheral countries (Web of Science and Scopus), are factors that allow broader participation in *Scientometrics*. These techniques and databases even reduce the relative importance of languages, as their access is possible with only basic English skills. The specificity of the method and the purpose of the journal seem to be more decisive than its application in central or peripheral contexts. Thus, the peripheries, including Latin America, are visible in *SCI*, and China has taken the lead. It may be considered that such standardization requires the inclusion of peripheral cases, given the desired universalization of the knowledge published, while the comparisons among regions follow clearly established patterns. In addition to these considerations, it is worth noting the coupling trends of transnationalization of *Scientometrics* and “the metric tide” ([Thelwall et al. 2015](#)); that is, the pervasive global use of quantitative indicators to evaluate science production and academic performance. As this evaluative culture became ubiquitous, so did the use

⁷ It could be argued that this fact is not exclusive of STS, but common to other fields belonging to social sciences. However, while there is a general agreement that social processes are usually specific of a given context, science tends to be seen as a “universal” research object.

of the techniques, although not always with the necessary rigor, as stated in DORA ([2014](#)) and other similar manifestos ([Invernizzi and Davyt 2019](#)).

In the journals specializing in science policy and innovation studies, the object of study is the factor that enables a greater international circulation: scientific and innovation policy tend to be highly isomorphic once countries with different levels of development emulate those of central countries ([Velho 2011](#); [Godin 2009](#)). Although the instruments, resources and results of such policies may vary, the object remains relatively similar, and the way it appears in different regions seem to attract leading journals' interest. Besides, theoretical consensus around evolutionary and institutionalist economy in this field ([Brandão and Bagattoli 2017](#)) facilitates the dialogue among researchers in different regions.

The journals with the lower transnationalization focus on socio-anthropological STS. Paradoxically, the subfield from which there has been stronger insistence on the situatedness of S&T is the one that looks less at "other spaces" of knowledge production. In these journals, the privileged object of study is hegemonic science and its embeddedness in the social contexts where it is produced, studied on the basis of theoretical frameworks generated in such spaces. Peripheral science, studied by peripheral STS communities, does not reach mainstream STS literature. As Baber ([2003](#)) has argued a while ago for the social sciences in general, and Kreimer ([2022](#)) demonstrates for the STS field, there is evidence that peripheral scholars are forced, explicitly or implicitly, to justify their analysis geographically so that they can take part in mainstream journals, as well as limit their theoretical production. A task for the future is to verify whether the production of peripheral STS, published in local journals, differs in topics, theoretical approaches, and methodologies of the production that reaches mainstream journals.

Other factors may have an impact on the scarce participation of peripheral STS in leading journals, such as the fragility of the field in those places or the difficulties to reach these journals due to, for instance, language barriers. It may also come from biases of leading journals, of the authors' failure to meet the standards of these publications, of lack of funding for translations and editing, or for paying Article Processing Charges (APCs).

It is necessary, indeed, to consider the aforementioned linguistic issue. Centers and peripheries in conventional geopolitical terms are intertwined here with the ones of the STS field, since non-English speaking central countries, given their linguistic policies, succeed in increasing the visibility of their STS production by publishing in English. Such is the case of Germany, the Netherlands, the Nordic countries and, more recently, this condition has extended to countries such as Japan, Israel, Singapore and, with more restrictions due to its thematic specificity, China. In contrast, the low performance of French authors in the journals in our sample is striking, taking into account that outstanding authors in the field such as Bruno Latour and Michel Callon, and a very influential school, come from this country. When the disadvantages in linguistic terms join the peripheral condition on geopolitical terms, the visibility of the field tends to be lower. In short, the linguistic inequality tends to reinforce the prestige of the center production and the peripheral character of the production in other regions.

Moreover, as we pointed out above, not all objects of study (scientific development, social relations, etc.) can be internationalized in the same way, and usually peripheral science engages in discussions different from the ones that take place at the centers. There is still another factor: some STS communities in the peripheries, due to political beliefs or because they constitute relevant locus of discussion, encourage the publication in the author's own language, at the expense of the journals published in English. For instance,

the Consejo Latinoamericano de Ciencias Sociales (CLACSO) advises, in a document addressed to science policy makers in Latin American countries:

The evaluation systems should not reward the production in English but support multilingualism, fostering not only official languages such as Spanish and Portuguese but also the production, communication and circulation of science in indigenous (native) languages of the region ([CLACSO-FOLEC 2020, 10](#)).

Conclusions

Notwithstanding the (at least rhetoric) interest shown by most leading journals in internationalizing their publications, the results are limited. The subfield with less internationalization is, paradoxically, socio-anthropological STS, despite reflections on post-coloniality and the provincialization of STS.

Our hypothesis is that there are, within the field, objects (scientific policy, innovation) and methods (scientometrics) that prove to be more universal and consensual, facilitating the shaping of a transnational discussion. In these cases, the linguistic obstacles and publishing policies (costs, quality requirements, etc.) do not seem to be so decisive for the transnationalization of journal authorship and content. Peripheral science, as an object of study for peripheral socio-anthropological STS, has proved to be the least visible matter in the leading journals. We point out three possible causes that need further research:

- a) The STS produced in the historical centers of the field has not had interest either in the “situated knowledge” outside the international scientific mainstream, or in the conceptual tools proposed by the peripheries in order to explain non-hegemonic science and technology.
- b) The linguistic barrier may be a greater obstacle in this journals’ profile, either by a more abstract sociological type of discussion; or because it implies to adopt theoretical approaches published in English, that are not necessarily useful in peripheral contexts; or, still, because there is a political stance of promoting publications in the local language and venues.
- c) There are, in the peripheries, fruitful discussion forums about peripheral socio-anthropological STS, where the interlocutors share a context, and maybe approaches, whereas the communication with other contexts is just emerging and more difficult.

The relational character of centers and peripheries of the field is a consequence of the historical and geopolitical characteristics whose stability makes them look like domination structures that are constantly reproduced. Simultaneously, such relationships are dynamic, and they open interstitial spaces for the centers and the peripheries to be transformed. Focusing on what is published means shading light, in turn, on what is marginalized. Or, in STS terms, centers enact peripheries and vice versa. By being invisible or set aside, the academic production in certain parts of the world becomes peripheral— turning irrelevant— for other regions and for the development of academic work.

In this regard, a certain correlation seems to operate: the ones who take non-hegemonic sciences and technologies as objects of research are placed within the STS international field as peripheral. Naturally, as in the correspondence between socio-economic development and scientific development, in the

foregoing there is a structural aspect that can be verified throughout the past few decades, but it would be a mistake to suppose that these positions are not subject to inflections and transformations, sometimes significant ones. For example, while Japan has been, for many decades, a key center of scientific and, mainly, technological production, its place in the STS field is, relatively speaking, much more peripheral than the one in other countries less scientifically dynamic, such as Spain or Denmark. Conversely, the Netherlands appear clearly over-represented in the STS production in connection with its scientific and technological system. It is clear that, however, multi-dimensional marginalization is reproduced in countries whose scientific systems are barely emerging, like in Sub-Saharan Africa or some Latin American countries.

One final thought about the STS field in Latin America that, in the current context, faces the tension between broadening its internationalization and strengthening its internal development, is worth mentioning. Fostering a greater internationalization, necessarily in English, would help making its own objects “universal”. On the other hand, deepening the field inwards, in order to generate more robust theoretical frameworks that meet the strengthening of local agendas and the regional STS field—a task to be carried out with a predominance of Spanish and Portuguese—leads to prioritizing the local relevance of its own developments, and the interlocutors from within the region. The resolution of this tension—and, maybe, a synthesis—does not depend only on the region but on how the combined dynamics of the centers and peripheries of the field evolves.

Annex

[Annex 1a](#). Total STS Publications by Country (2010–2019). Source: Web of Science.

Country	n. of papers	Country	n. of papers	Country	n. of papers
United States	1404	Switzerland	136	Turkey	36
United Kingdom	855	Japan	116	Hungary	33
China	756	Norway	112	Ireland	31
Spain	428	India	100	Argentina	30
Germany	422	Finland	98	Russia	30
Netherlands	382	Austria	89	Slovenia	26
Italy	318	Portugal	75	Greece	25
Canada	261	South Africa	54	New Zealand	24
Sweden	212	Iran	53	Chile	22
France	195	Israel	50	Czech Republic	18
Denmark	188	Mexico	43	Colombia	15
Australia	186	Pakistan	39	Serbia	14
Korea	178	Malaysia	38	Romania	11
Belgium	172	Poland	37	Croatia	9
Brazil	143	Singapore	36	Cuba	9

Annex 1b. Total STS Publications by Country (2010–2019) *continued*. Source: Web of Science.

Country	n. of papers	Country	n. of papers	Country	n. of papers
Saudi Arabia	8	Peru	3	Latvia	1
Estonia	7	Slovakia	3	Lebanon	1
Luxembourg	7	Bosnia-Herzegovina	2	Libya	1
Thailand	7	Costa Rica	2	Lithuania	1
Uruguay	7	Cyprus	2	Malawi	1
Morocco	6	Kuwait	2	Mozambique	1
Ukraine	6	Philippines	2	Niger	1
Bulgaria	5	Armenia	1	Nigeria	1
Egypt	4	Azerbaijan	1	Qatar	1
United Arab Emirates	4	Belarus	1	Rwanda	1
Venezuela	4	Ghana	1	Vietnam	1
Benin	3	Guatemala	1	Total	7621
Ecuador	3	Iceland	1		
Kenya	3	Jordan	1		
Palau	3	Kazakhstan	1		

Annex 2. Number of Publications in *Scientometrics* by Country (2010–2019). Source: Web of Science.

Country	n. of papers	Country	n. of papers	Country	n. of papers	Country	n. of papers	Country	n. of papers
Argentina	5	Cuba	9	Ireland	5	Norway	19	Sweden	49
Armenia	1	Cyprus	2	Israel	19	Pakistan	33	Switzerland	28
Australia	71	Czech Republic	11	Italy	129	Palau	3	Thailand	3
Austria	28	Denmark	29	Japan	60	Philippines	2	Turkey	33
Azerbaijan	1	Ecuador	2	Jordan	1	Poland	25	Ukraine	6
Belgium	97	Egypt	3	Korea	111	Portugal	21	United Arab Emirates	1
Benin	3	Estonia	3	Kuwait	2	Romania	8	United Kingdom	117
Bosnia-Herzegovina	2	Finland	23	Lithuania	1	Russia	24	United States	270
Brazil	102	France	51	Luxembourg	2	Saudi Arabia	7	Venezuela	2
Bulgaria	2	Germany	134	Malaysia	33	Serbia	14	Vietnam	1
Canada	70	Greece	15	Mexico	30	Singapore	9	Total	2,978
Chile	13	Guatemala	1	Morocco	6	Slovakia	2		
China	639	Hungary	29	Netherlands	91	Slovenia	20		
Colombia	12	India	92	New Zealand	3	South Africa	31		
Croatia	7	Iran	47	Niger	1	Spain	252		

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