

# THE USE OF BIG-DATA AND META-DATA FROM THE SO.RE.COM. “A.S. de Rosa” @-LIBRARY FOR GEO-MAPPING THE SOCIAL REPRESENTATION THEORY’S DIFFUSION OVER THE WORLD AND ITS BIBLIOMETRIC IMPACT

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## Abstract

The goal of this contribution is to present the use of *almost big-data* and *meta-data* from the *So.Re.Com. A.S. de Rosa @-library* for geo-mapping the Social Representation Theory's diffusion over the world and its bibliometric impact.

Social Representations and Communication is a supra-disciplinary area of the social sciences, inspired by the Social Representations Theory, one of the most important theories of the social construction of knowledge and its relation to socially situated practices in the dialogue between expert and lay people knowledge and media. Originally European, it is currently a multilingual, worldwide supra-disciplinary field with a substantial body of literature.

The *So.Re.Com. “A.S. de Rosa” @-library* [1] [2] is a multiform digital environment of integrated relational data-bases conceived in the logic of the semantic web, including a series of web interfaces aimed to integrate *documentation services* (bibliographic repository, meta-theoretical analysis repository, intelligent @-Library) with *networking* (interactive web-videoconference, on-line So.Re.Com. virtual community) and *research training* (European/International Joint PhD “Virtual Campus”: video-courses in streaming, distant tutoring and co-tutoring, on-line trainee evaluation, etc. <http://www.europhd.eu>). It includes almost 10000 references, and a vast and growing collection of bibliographic entries and a series of specific web-tools designed by *Annamaria Silvana de Rosa*, who is also the creator and the program director of the *European/International Joint PhD in Social Representations and Communication* and of the *So.Re.Com. THEmatic NETWORK*.

Based on a multi-year research program aimed at an empirical meta-theoretical analysis of the complete body of literature on Social Representations, a selection of results visualized according a technique designed ad hoc [3] to geo-map the development and the dissemination of the theory across the continents, over several generations of scientists will be presented. Comparative analyses - based on almost “*big data*” and “*meta-data*”, filed in our *SoReCom “A.S. de Rosa” @-library* repositories, concerning authors' countries and institutional affiliations and bibliometric indexes (Impact Factor and SJR) will show the scientific impact of the global theory dissemination. The implications of the “*impact of the impact*” will be discussed in the light of the critical debate, which still animates the community of scientists, stimulating meta-reflexive discussion and view exchanges among the members of our scientific community on the preferable publishing options and collaborative strategies in the current editorial and academic scenario. The presentation will illustrate the prototypical use of the *SoReCom “A.S. de Rosa” @-library* as a research tool, rather than simply an online repository for scientific documentation.

Keywords: *SoReCom “A.S. de Rosa” @-library*, Social Representation Theory's diffusion, bibliometric impact, *big data*, *meta-data*.

## 1 GOAL, RESEARCH DOMAIN AND DIGITAL TOOLS

The *goal* of this contribution is to present the use of almost big-data and meta-data from the *So.Re.Com. A.S.deRosa @-library* for geo-mapping the Social Representation Theory's diffusion over the world and its bibliometric impact. The article illustrates the prototypical use of the *SoReCom “A.S. de Rosa” @-library* as a research tool, rather than simply an online repository for scientific documentation [1] [2].

*Social Representations and Communication* is a supra-disciplinary area of the social sciences, inspired by the Social Representations Theory, one of the most important theories of the social

construction of knowledge and its relation to socially situated practices in the dialogue between expert and lay people knowledge and media. Founded by Serge Moscovici (honorary programme director of the European/International Joint PhD in S.R. & C.) [4] in 1961, after more than 50 years, the study of social representations, originally specifically European, is currently a multilingual, worldwide discipline with a substantial body of literature, involving leading scholars from social psychology and other social sciences [5] [6] [7] [8].

The *So.Re.Com. "A.S. de Rosa" @-library* is a multiform digital environment of integrated relational data-bases conceived in the logic of the semantic web, including a series of web interfaces aimed to integrate *documentation services* (bibliographic repository, meta-theoretical analysis repository, intelligent @-Library) with *networking* (interactive web-videoconference, on-line So.Re.Com. virtual community) and *research training* (European/International Joint PhD "Virtual Campus": video-courses in streaming, distant tutoring and co-tutoring, on-line trainee evaluation, etc.). It includes almost 10000 references, and a vast and growing collection of bibliographic entries and a series of specific web-tools designed by *Annamaria Silvana de Rosa*, who is also the creator and the program director of the *European/International Joint PhD in Social Representations and Communication* (<http://www.europhd.eu>) [9] [10] and of the *So.Re.Com. THEmatic NETwork* (<http://www.europhd.eu/SoReComTHEmaticNETwork>) [11] [12].

Based on a *multi-year research program aimed at an empirical meta-theoretical analysis* of the complete body of literature on Social Representations [13] [14] [15] [16] [5] [8] a selection of results visualized according a technique designed ad hoc [3] to geo-map the development and the dissemination of the theory across the continents, over several generations of scientists will be presented. Comparative analyses - based on almost "*big data*" and "*meta-data*", filed in our *SoReCom "A.S. de Rosa" @-library* repositories, concerning authors' countries and institutional affiliations and bibliometric indexes (Impact Factor and SJR) will show the scientific impact of the global theory dissemination.

However, before presenting the comparative analyses on the "*impact of the impact*" of the literature restricted to the indexed journals or enlarged to the whole production, we will illustrate the evolution of the bibliometric culture in the recent decades and will review controversial positions related to the critical debate on the new research assessment culture.

## 2 THE BIBLIOMETRIC CULTURE ERA: FROM THE SCIENCE CITATION TO WEBOMETRICS AND BEYOND.

Moving from the scope of *information retrieval* and *science citation* [22] [23] to a progressive application of *infometrics* for academic quality evaluation, the exponential use of bibliometrics has raised questions which have generated a highly polarised debate about the relevance, actuality and legitimation of the use of infometrics for science knowledge and science policy.

De Bellis [24] in his book "*Bibliometrics and Citation Analysis: From the Science Citation Index to Cybermetrics*" starts from the observation that "since citation indexes came into the limelight during the mid-1960s, citation networks have become increasingly important for many different research fields." He begins by investigating the empirical, philosophical, and mathematical foundations of bibliometrics, including its beginnings with the Science Citation Index, the theoretical framework behind it, and its mathematical underpinnings. He then examines the application of bibliometrics and citation analysis in the sciences and science studies, especially the sociology of science and science policy. Finally, he provides a view of the future of bibliometrics, exploring in detail the ongoing extension of bibliometric methods to the structure and dynamics of the World Wide Web.

Recently published books and articles have furnished updated and more comprehensive overviews of theories, techniques, concepts, and applications in the interdisciplinary and steadily growing field of bibliometrics until its recent evolution from *Webometrics* to *Altermetrics*. The latter is based on the transactions of users in the new scenario of the Web 2.0 and the on-growing scenario of *social networking* of especial interest to scholars now undertaking large-scale migration to online publishing and moving toward a universe of web-native communication ([25]; [26]; [27]; [28]; [29]; [21]; [30]; [31])

Blaise Cronin, professor of Information Science at Indiana University Bloomington and author of *The Hand of Science: Academic Writing and Its Rewards* (2005) [32] and Cassidy Sugimoto, assistant professor in the School of Informatics and Computing at the same University, have edited a new book *Beyond Bibliometrics* (2014) [29], illustrating how bibliometrics has moved well beyond the mere tracking of bibliographic citations. The Web enables new ways to measure scholarly productivity and

impact. It makes available tools and data that can reveal patterns of intellectual activity and impact that were previously invisible: mentions, acknowledgments, endorsements, downloads, recommendations, blog posts, tweets. Cronin and Sugimoto's book [29] examines a variety of alternative metrics – or “altmetrics” – while also considering the ethical and cultural consequences of relying on metrics to assess the quality of scholarship. The contributors to *Beyond Bibliometrics* discuss the changing environment of scholarly publishing, the effects of open access and Web 2.0 on novel analytical methods, and the emergence of next-generation metrics in a performance-conscious age.

Within the fast-growing, multidisciplinary field of bibliometrics, which ranges from webometrics to scientometrics to influmetrics, by providing real-time information, so-called “altmetrics” are changing the way in which research impact is understood. Jason Priem and Heather Piwowar (2012) [33] outline the launch of ImpactStory (<http://impactstory.it/>), a new open-source webapp intended to provide a broader picture of impact to help researchers tell data-driven stories about their broader impacts. Instead of the Wall of Numbers, Priem and Piwowar [33] categorize the impacts along two dimensions: audience (scholars or the public) and type of engagement with research (view, discuss, save, cite, and recommend). Figured in each dimension is the author's percentile score compared to a baseline; in the case of articles, the baseline is “articles indexed in Web of Science that year.” Priem and Piwowar, [33] .

Some reasonable doubts about the use of social media in the research evaluation and the need to distinguish between authors' *social popularity* (based on opinion) and *scientific impact* (based on peer reviewed quality filter of scientific facts and results) have been in 2014 expressed by H. Moed [34] ,[35]. Also professionals devoted to Altmetric company's mission recognise that “Altmetric allows authors and their institutions to see what people are saying about a scholarly paper and can tell them how much attention a paper is receiving relative to their peers”, and therefore it is becoming an increasingly widespread tool for monitoring and reporting on the broader impact and dissemination of research, but it is not the tool to evaluate its content's scientific quality (Chimes, C. 2014) [30]. It is evident that the Open networked science scenario (Tapscott D. Williams A.D., 2008 [36]; Nielsen, M. 2012 [37]) and the progressive computerisation of the research process are modifying the research practices in the era of the Science 2.0. and this will not be irrelevant also for the evaluation of the science impact.

## **2.1 The controversial debate on the impact of bibliometrics on the academic culture of quality evaluation system**

The evolutionary scenario of the new bibliometric culture from *Science Citations* to *Scientometric* to *Altmetrics* is widely documented in a multi-disciplinary research field which has moved from information science, informatics, statistics, mathematics, technology, communication and new media studies, but which, due to asymmetric applications in the domain of social sciences and humanities compared natural and applied sciences, has crossed epistemological issues in the history of sciences and their disciplinary policies. It is evident that the competitive market logic has been a driving force in the development of *Infometrics* and complementary methodological apparatuses for benchmarking. This has been due to the strong commercial interests of publishing houses in positioning their journals in the bibliometric databases, so that authors are induced to identify methods of journal benchmarking.

Moskovkin, Bocharova and Balashova (2014) [38] have, for example, introduced and developed the methodology of journal benchmarking as an analytical procedure for continuously monitoring and comparing the advance of specific journal(s) against that of competing journals in the same subject area, together with the application of best practices defined in order to improve a journal's own advance and gain a position among leading scientific journals. As regards practical implications, the detailed journal scoreboard and prediction calculations make it possible to devise strategies and policies for the promotion of journals in the Web of Science and Scopus databases.

Since the application of bibliometric data started to be widely used for the measurement of university research performance (Moed, [39],[40],[41]) (with major consequences in many sectors of resource distribution, from research funds to human resources allocation and career promotion), the competition has been extended from journals and their publishing houses to academic and research institutions, giving rise to a multiplication of external ranking agencies and internal assessment committees dealing with the evaluative process at local, national and international level. They are increasingly the targets of several ranking systems and institutional benchmarking, even orienting ministerial policies at governmental country level (sometime in collaboration with spin-offs originated

by the publishing houses themselves). When the application of bibliometric data has been mis-used, *wealth competition* has often degenerated into *insane conflicts* “within” and “between” research departments, scientific communities, and different disciplinary affiliations to produce “*bad practices*” (like writing and publishing more than reading; mutually exchanging author’s quotations and even author’s signatures to increase the number of citations or individual publications; collaborating instrumentally rather than genuinely sharing scientific interests; devaluing book production in favour of articles in indexed journals, etc.).

If from one side an increase in papers authored by an extremely large number of researchers, is strictly related to the nature of the collaborative scientific outputs (like in the *ATLAS* collaboration papers published in 2008 with 2,926 authors and in 2012 with 3,171 authors; or in the *Nature* article on the Initial Sequencing and Analysis of the Human Genome by the *International Human Genome Sequencing Consortium* with about 2,900 authors published in 2009); in other fields the phenomenon of an impressive increased number of co-authorship (compared to single author paper) may also reflect the increased pressure “*to publish or to perish*” on the researchers for their academic career.

In order to answer the questions if individual researchers actually write more articles every year or more authors write more collaboratively, Plume and van Weijen [42] have checked different characteristics of authorship patterns over time on trend data from Scopus for 2003 – 2013 based on the count of articles, reviews and conference papers published each year and the count of authorships and unique author names associated with these. Results show that: a) there has been a consistent growth in the number of articles published over the past decade (from 1.3 million in 2003 to 2.4 million in 2013); b) the number of authorships (defined as the occurrence of an individual on an article) has increased at a far greater rate from 4.6 million in 2003 to 10 million in 2013; c) the number of authorships per unique author (defined as individual who has appeared on one or more articles in a given period or single year) has increased (2.31 in 2013); d) at the same time, the number of articles per unique author has declined (0.56 in 2013), while the total number of articles published per year has increased; e) the percentage of single authored papers has declined from 20% in 2003 to 13% in 2013, while in the same decade (2003-2013) the average number of authorship per article has increased from 3.5 to 4.15 authors.

Plume and van Weije [42] do not attribute this trend to “*bad practices*”, but interpret the rise of ‘*fractional authorship*’ or fractional contributions to papers, as the way in which authors manage more wisely their capacity to achieve productive results, by becoming more collaborative. “A given author may achieve this output by appearing as ninth author on 5 different paper (5 x 0.1 authorships per paper), instead of co-authoring as second author on a pair of 4-author papers per year (2 x 0.25 authorships per paper).” For those who believe that the academic imperative “*to publish or to perish*” should be at least integrated by “*provided that to publish is worth!*”, this accounting logic of the academic work is indeed quite alien.

In order to detect “*bad practices*” (instrumentally goal-oriented) and to distinguish them from the “*good practices*” and trends that affect the dynamics of science production and diffusion (like, for example, the increase of inter-institutional and international collaborations, the creation of joint lab, the open science scenario, etc.), more observational and empirical researches on the publishing practices adopted by the authors belonging to different scientist’s disciplinary communities are needed. Moed [34] [35] has shown empirical evidence that - even within the so called domain of humanities and social sciences - differences exist not only among various disciplines, but even within the same discipline (for example between experimental psychology and social psychology) regarding the number of authors for article and regarding the practice of author’s citations versus full text downloaded by the readers. These analyses should be based both on field studies, on top exemplary case studies and on big data about the changes of publishing strategies especially in a prospective scenario of fast systemic change in science 2.0. with the deriving opportunities and threats: the growth of authorship, the explosion of publication and the availability of data (Burgelman, Osimo and Bogdanowicz [43]).

The *controversial nature of the debate on the impact of the bibliometric culture on the academic culture of research evaluation*, from both the institutional and individual perspectives, has produced a rich body of literature on the *uses and abuses* of bibliometric tools and their application in diverse disciplines: [44] [45] [46] [39] [34] [35] [47] [48] [49] [50] [51] [52] [53] [54] [55] [56] [57] [58] [59] [60] [24] [28] [61] [62] [63] [64] [65].

Among the critical voices, Molinié and Bodenhausen [54] in ‘*Bibliometrics as Weapons of Mass Citation*’, appealed to scientists of all countries and disciplines to unite against the tyranny of

bibliometrics, arguing in favour of a return to the values of *'real science'*, in analogy with the return to a *'real economy'*.

Welcoming the appeal to unite against the tyranny of bibliometrics, the Nobel Prize-winner for chemistry Richard Ernst [55]) has denounced "*The follies of citation indices and academic ranking lists*":

"The present hype of bibliometry made it plainly obvious that judging the quality of science publications and science projects by bibliometric measures alone is inadequate, and reflects the inadequacy of science management regimes staffed by non-scientific administrators or by pseudo-scientists who failed to develop their own personal judgment. Today, an erroneous conviction prevails that institutions and individuals of 'value' can be measured ultimately in terms of a single number that may form part of a competitive 'ranking list'!" (Ernst, R. 2010) [55])

As a final plea, Ernst's personal wish as an author "remains to send all bibliometrics and its diligent servants to the darkest omnivoric black hole that is known in the entire universe, in order to liberate academia forever from this pestilence" (Ernst, R. 2010: 90) [55]).

Critical remarks on the bibliometric reductionism are not exclusive to scientists who share Ernst's view; they are also expressed by well-informed and reputable experts in this field. "The bibliometric reductionism is one of the many forms in which it is manifested in the course of the history of science, the search for absolutes in the areas governed by uncertainty and complexity. It is not only a requirement speculative. Used uncritically, the bibliometric indicators can provide deadly weapon rhetoric to legitimize political decisions already taken on the basis of criteria that have nothing to do with the fairness of judgment" (De Bellis, N. 2014: 18-9 [28])

Indeed, critical voices are not new if we return to positions taken up almost twenty years ago: "the journal cannot in any way be taken as representative of the article. Even if it could, the journal impact factor would still be far from being a quality indicator: citation impact is primarily a measure of scientific utility rather than of scientific quality, and authors' selection of references is subject to strong biases unrelated to quality. For evaluation of scientific quality, there seems to be no alternative to qualified experts reading the publications. Much can be done, however, to improve and standardise the principles, procedures, and criteria used in evaluation, and the scientific community would be well served if efforts could be concentrated on this rather than on developing ever more sophisticated versions of basically useless indicators. In the words of Sidney Brenner, "What matters absolutely is the scientific content of a paper, and nothing will substitute for either knowing or reading it." (Seglen P. [44].

Moed [34] [35] has, for example, stressed how the citations in social sciences are influenced by fashion trends for political ideologies, showing on the basis of empirical data the decline of the citations to Marx and Lenin, which has become extremely evident after the fall of the Berlin wall.

In our opinion, the impact of the bibliometric culture on the academic quality evaluation system has not yet been adequately examined on the basis of systematic investigation and more research are needed on research practices and the interaction with the adoption of the bibliometric tools for research evaluations in different disciplinary areas, also taking into account that the history of science almost coincides with history of natural science and that social sciences and humanities are widely disregarded. The academics' attitudes continues to be often permeated by ideological pre-options, biased by individual advantage in valorising/devaluing the bibliometric indexes to measure own scientific quality.

Given our responsibility for the future academic careers of the early stage researchers enrolled on our European/International Joint PhD, we have started to inform them about infometric tools, their use and misuse. This informational commitment entails stimulating their awareness of the "impact of the impact" produced by the bibliometric culture on the academic quality evaluation system, and training them how to choose strategically "where" and "how" they may successfully publish. We pursue this commitment:

- without diminishing a critical attitude in deciding "*if*" or "*when*" to publish and without dismissing interest in "*what*", for "*what purpose*" to publish (accordingly revising the academic motto "*Publish or Perish*" by adding "*only on the condition that it is worth it!*");
- without devaluing the importance of multiple formats for knowledge dissemination (not only articles, but also books and multi-media and new media-based tools). "The progressive de-evaluation of the "book" format in favor of collections of articles is coherent with an academic

culture that is more and more dominated by the quantification ethos of scientific output assessed with bibliometric indicators. The competitive pressure to publish occurs in the changing scenario of the editorial world in the digital era and in a climate where new tools for disseminating knowledge are constrained by the impetus for rapid and brief communication, although scientists are well aware that thinking, creating, innovating and disseminating scientific knowledge is not just tweeting.” (de Rosa [66]). Indeed the emulation of the publishing strategies popular in the natural science by the authors belonging to social science induced by the impact on their career of the diffusion of the bibliometric evaluation culture has been object of investigations and critical analyses conducted in different European countries (Netherlands, Switzerland, Germany, UK, France, Denmark, Spain) presented in 2014 by Thed Van Leeuwen, Sven and Michael Ochsner [67], by Jochen Glaser [63], by Nigel Vincent [62], by Ioana Galteron and Geoffrey Williams [68], by Alessia Zuccala [64] and a stimulus for defining indicators for SSH 's book publishers by Elena Gimenez Toledo [68];

- without decreasing the interest in “*reading publications instead of merely rating them by counting citations!*” or in originality and innovation in knowledge discovery and dissemination instead of the scientist’s bias towards cloning mainstream material under the pressure to publish – as empirically confirmed by data on authors based in the US (Fanelli, 2010 [56])). “The growing competition and “publish or perish” culture in academia might conflict with the objectivity and integrity of research, because it forces scientists to produce “publishable” results at all costs. Papers are less likely to be published and to be cited if they report “negative” results (results that fail to support the tested hypothesis). Therefore, if publication pressures increase scientific bias, the frequency of “positive” results in the literature should be higher in the more competitive and “productive” academic environments. This study verified this hypothesis by measuring the frequency of positive results in a large random sample of papers with a corresponding author based in the US.” (Fanelli, D. [56]). On the perverse effect of the confirmatory publishing strategy as depending on the competitiveness of science and careerism which encourages exaggeration and the cherry-picking of results, it is interesting to read *The Economist*, Oct 19th 2013, *How Science goes wrong. Scientific research has changed the world. Now it needs to change itself.*

For this purpose we have dedicated some of the sessions of the training events of the *European/International Joint PhD in Social Representations and Communication* to “*Writing skills and publishing policies*”, disseminating knowledge about bibliometric tools (“*when, why and how do you use them*”) increasing the odds of being published in the current scenario, and about the debate on metrics and non-metrics approaches to the evaluation of scientific products. This topic has become a regular part of training in transferable skills, especially of the *yearly Winter Session of the International Lab Meetings* and also of other training coordinating meetings, aimed at periodically monitoring the ESR’s progress on the *Meta-Theoretical Analysis*: <http://www.europhtd.eu/IntlLabMeetings>

The spirit that animates our interest in considering the “*impact of the impact*” is coherent with the *opinion piece for the Bulletin of the European Association of Social Psychology*, written together with other internationally recognized social psychologists convened in a small meeting in Lausanne (June 12-14, 2013) to reflect on the new conformism dominating research practices in social psychology and to launch debate within the European Association of Social Psychology (EASP) [70]. It states:

“(…) excellence and quality seem increasingly equated with scientism resulting in publications of brief research reports and the use of limited criteria for deciding about careers, prestige and funding. Scientific quality is critical for the viability of any discipline and for making an informed and responsible contribution to societal debates. But the sole emphasis on number of publications, impact factors, H-index and the like, contributes to an unwelcome homogenisation of the field in general, and of European social psychology in particular. Is this why European researchers prefer to publish in American journals? Why the impact factor of the EJSP remains quite low despite high rejection rates? Why American journals are more diverse? This quantification ethos of our discipline undermines risky and potentially innovative work as well as the use of a broader range of knowledge dissemination and publication channels. To recognize and assess research ideas, proposals, papers, and other types of output, a relevant social psychology needs a workable set of diversified and balanced criteria that includes the active dissemination and use of the knowledge produced.” [70]

Another motivational driving force for involvement in the field of bibliometric culture is closely related to improvement of the So.Re.Com. “*A.S. de Rosa*” @-*library*, and its exploitation as a scientific tool to conduct empirical research on the development and dissemination of the social representations literature around the world (by continents, countries, cities and even single institutions of author

affiliation) and across the generations of scientists belonging to different academic cultures and contexts and working in different thematic areas, by different paradigmatic and methodological approaches. Reconstructing the kind and evolution of inter-individual and inter-institutional co-operations is another goal of the meta-theoretical analysis. Adding the bibliometric indexes to the rich set of data and meta-data detected for each bibliographic item is intended to evaluate also the “*impact of the impact*” of the literature inspired by the social representations theory.

### 3 GEO-MAPPING THE GLOBAL DISSEMINATION OF THE SOCIAL REPRESENTATIONS THEORY AND ITS IMPACT IN THE BIBLIOMETRIC CULTURE ERA

In this section we present a selection of results visualized according to a technique designed ad hoc (de Rosa, 2014c) [3] for geo-mapping the development and the dissemination of the theory across the continents, over several generations of scientists, and according to thematic, paradigmatic and methodological approaches. Given the limited space available, here I will discuss only some of the comparative analyses based on “*big data*” and “*meta-data*” filed in our *SoReCom “A.S. de Rosa” @-library* repositories, concerning authors’ countries and institutional affiliations, and in particular:

- a. those related to the various bibliometric indexes (Impact Factor and SJR) as derived from the two largest bibliometric databases: Isi-web of Science Thomson and Reuters and Scopus-Elsevier, presenting the geo-mapping by Continents according to the country of the author’s institutional affiliation when considering comparatively the inclusion of the scientific production in both (a1.) or exclusively in just one of the two bibliometric idatabases of indexed journals (a.2);
- b. the *geo-mapping* of the wider scientific production in Social Representations and comparative results with the restricted sources included in the indexed bibliometric databases;

#### 3.1 Sources for the empirical analyses and main results

The bibliographic sources of the empirical data used for our analyses were extracted from a larger number of 9643 bibliographic references (as of June 2014), of which 8740 items specifically related to social representations and communication (including also books, book chapters, conference presentations, web documents, manuscripts, university reports, Master and PhD theses, etc.) filed in the repositories of the *SoReCom “A.S. de Rosa” @-Library* [1] [2]. The results show that out of a total of 3239 articles related to Social Representations and Communication filed in our repositories:

- 1747 (54%) articles have been published in “*not indexed*” journals.
- 1492 (46%) in 450 “*indexed*” journals included in at least one of the bibliometric databases (Isi-web of Science Thomson and Reuters and Scopus-Elsevier). The 450 journals are distributed as illustrated in the Fig. 1 according to the criterion of inclusion in both or at least one of the two bibliometric databases: although the majority (65%, f= 295) are indexed by both IF and SJR, those indexed only by IF (Isi-Web of Science) represent the 9% (f=40) compared to the 26% (f=115) indexed by SJR (SCImago Scopus-Elsevier).

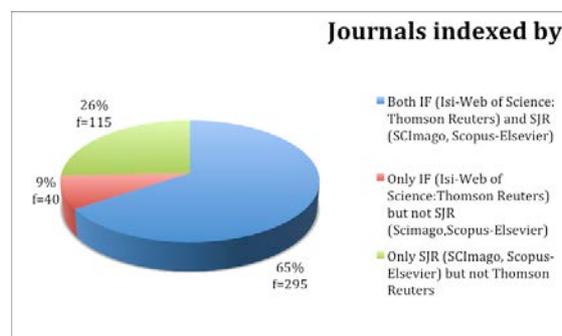


Fig. 1. The distribution of 450 “indexed journals according to the inclusion in the bibliometric databases

This wide range of 450 “*indexed*” journals is in itself an indicator of the impact of the Social Representations theory and research field, which has gained its visibility beyond the borders of social

psychology and, thanks to its supra-disciplinary epistemological power of attractiveness, has reached audience in journals from many disciplinary and thematic fields.

Based on a selection of 3239 articles related to Social Representations and Communication published in journals, the analyses of the results (Fig. 2 and Fig. 3) show that 1088 (34%) are included in both the databases from which the bibliometric indexes were extracted:

- *Impact Factor* (Thomson and Reuters) = 1174 articles, of which only 81 (2%) were included exclusively in Isi-web of Science;
- *SJR* (Scopus-Elsevier) = 1.414 articles, of which only 323 (10%) were included exclusively in Scopus.

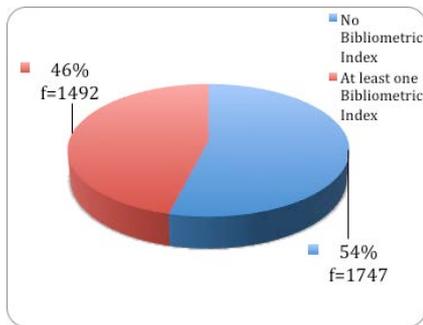


Fig. 2 Sources: the distribution of 3239 articles published in “not indexed” and “indexed journals”

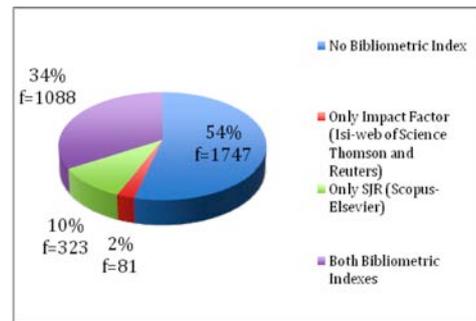


Fig. 3 The distribution of 3239 articles published in “not indexed” journals or included in one or both of the “bibliometric databases”

Inspection of the frequencies distribution of indexed journals included in one or two bibliometric databases by “country ranking” clearly shows the dominance of English-speaking countries: United Kingdom (especially for the scientific production published in indexed journals by SCImago Scopus-Elsevier) for Europe as a continent and the United States (the only North American country appearing for the scientific production published in indexed journals by IF Isi-web of Science), for the continent of America, followed by the Netherlands (a country where scientists publish mainly in English and are strongly linked with the British and North American scientific world and where the headquarters of the Elsevier publishing multinational company is located) (see Fig. 4).

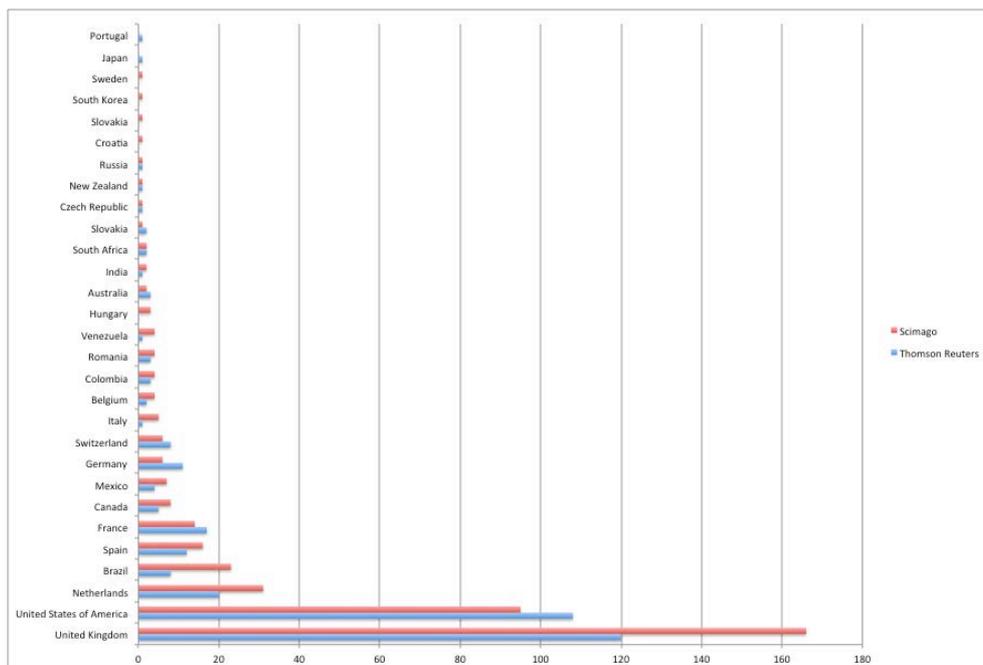


Fig. 4 The frequencies distribution by “country ranking” based on the 450 “indexed journals” included in at least one or two bibliometric databases Isi-Web of Science and SCImago

### 3.2 Geo-mapping the wider scientific production in Social Representations and comparative results with the restricted sources included in the indexed bibliometric databases.

Comparison of the results based on the indexed journals with the geo-mapping by the authors' institution continents based on all 3239 articles on social representations published in journals filed in the *SoReCom "A.S. de Rosa" @-library* bibliographic repository (and not only in the 450 indexed journals by "country ranking" as represented in the Fig. 4) evidences the prominence of Europe, and even more so of Latin America (compared to North America), for articles published in non indexed journals; whereas North America, Asia and Oceania are the prominent continents for articles published in indexed journals, compared to Europe (where the theory was initially generated and spread) and to Latin America (where the theory has been largely disseminated in the last two decades) (see Fig. 5).

An even more impressive paradoxical effect emerges when the prominence of the three countries (United Kingdom, United States and Netherlands) in the distribution of 450 indexed journals including publications on social representations (Fig. 4) by "country ranking" is compared with the geo-mapping of the entire scientific production (8348 items of the 8740, specifically related to social representations and communication, including also books, book chapters, conference presentations, web documents, manuscripts, university reports, master and PhD theses, etc., on which at the time of writing this article in June 2014 it has been possible to identify the country of the author's Institution affiliation) filled in the *SoReCom "A.S. de Rosa" @-library* by continents and countries (Fig. 6).

A clear prominence of the European countries (especially France, UK, Italy, Spain and Switzerland) and Latin American countries (especially Brazil, Argentina, Mexico and Venezuela) - among the list of 72 countries represented worldwide - emerges in the production-diffusion of the literature related to this scientific field (due to space limits we cannot include all graphs by countries, continent by continent).

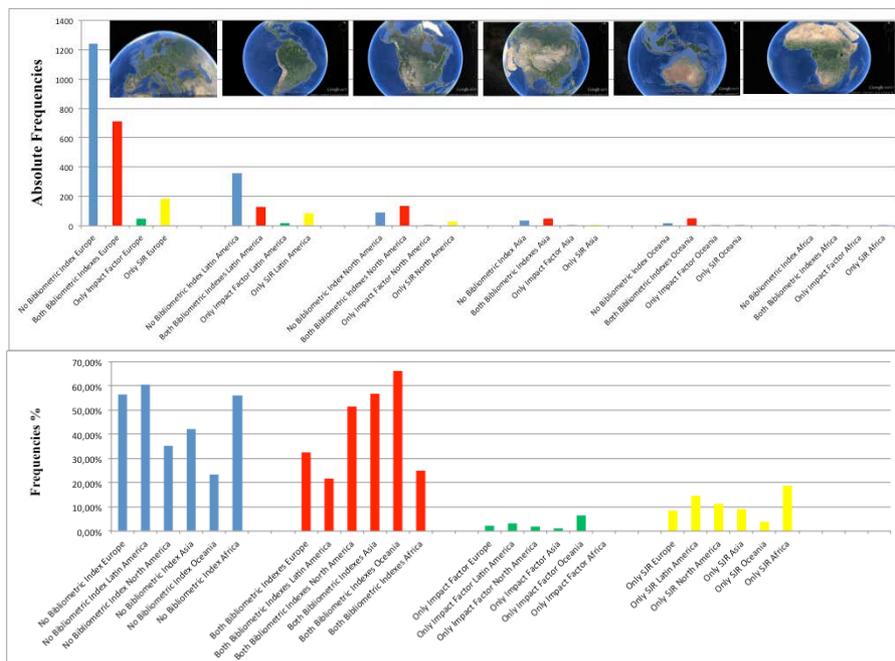


Fig. 5 The absolute and % frequencies' distribution of 3239 publications in "non indexed" and "indexed journals" by continents according to the country of the author's institutional affiliation



Fig. 6. The worldwide % frequencies distribution of 8348 items specifically filed in the repositories of the *So.Re.Com. "A.S. de Rosa" @-Library* by Continents according to the country of the author's institutional affiliation



Fig. 7 The % frequencies distribution of 5488 items by the **Continent Europe** according to the country of the author's institutional affiliation



Fig. 8 The % frequencies distribution of 2112 items by the **Continent Latin America** according to the country of the author's institutional affiliation

In fact in terms of absolute frequencies we find 5488 publications in **Europe**, including 28 countries where the top frequencies of publications (with  $f =$  more than 150) are produced by authors belonging to institutions in France ( $f = 1847$ ; 33,66%), UK ( $f = 820$ ; 14,94%), Italy ( $f = 752$ ; 13,70%), Spain ( $f = 472$ ; 8,6%), Switzerland ( $f = 464$ ; 8,5%), Austria ( $f = 276$ ; 5,03%), Portugal ( $f = 231$ ; 4,2%), Germany ( $f = 150$ ; 2,73%) (Fig. 7). On the basis of the 2112 publications filed in the repositories of the *SoReCom "A.S. de Rosa" @-library*, **Latin America** is the second geo-cultural area in the world for the scientific production in the field of Social Representations and Communication with authors belonging to 17 countries: among them Brazil is the prominent one with its 1191 publications (56,39%), followed by a group of Latin American countries (Argentina, Mexico, Venezuela) with more than 100 publications (Fig. 8).

Not only in terms of the prominence the geo-mapping of the literature produced by authors belonging to different Continents/Countries differ when comparing the restricted sources extracted by the 450 "indexed journals" with the entire production filed in the *SoReCom "A.S. de Rosa" @-library*, but also in terms of the number of diversified countries and therefore of different geo-cultural contexts which contribute to the development of theory and research in the supra-disciplinary field of Social Representations and Communication. In fact the number of the worldwide countries represented in the entire corpus of 8348 items are 72 (among them 44 countries corresponding to author's publications in journals indexed in both bibliometric data bases, 55 countries corresponding to author's publications in not indexed journals), whilst the list of the "country ranking" included in at least one of the bibliometric databases is restricted to 29 (24 countries for articles indexed only in Isi-Web of Science for IF and 27 only in SCImago Scopus-Elsevier for SJR) (see Fig. 4).

It is evident from the statistical results visualized on the geo-maps that a serious epidemiological study on the diffusion of a scientific field cannot take into account partial sources of information (only articles and not also books; only articles in indexed journals and not the entire scientific production).

The scope of our analysis is much wider and will be not limited to use a single variable (like in this case the author's institution country-continent) to identify "who is working with whom and where", but

also for example “on what”, by using which paradigmatic approach, by articulating or differentiating which other theoretical constructs which kind of methodologies, etc. etc. according to the very rich “*Grid for the meta-theoretical analysis of the whole corpus of the Social Representations literature*” (de Rosa, last version February 2014). However, due to page limits, it is impossible to include here even the full list of the 450 “indexed” journals in which the 1492 (46% of our corpus) articles has been published and that we have categorised in different classes according to their ranking in the bibliometric databases Isi-Web of Science and SCImago Scopus-Elsevier and also of the list of “not indexed” journals, in which the 1747 (54% of our corpus) articles have been published. These results deserve a specific publication, providing both a contribution to the systematic geo-mapping of the editorial channels for the dissemination of the social representation theory and research literature around the world, for illustrating the dynamic of knowledge in context produced according to the generational level of the scientists, their language and cultural constrains, the inter-institutional collaboration within and between countries and continents etc. and at the same time a strategic tool for orienting the new generation of early stage researchers, faced by the bibliometric academic culture era for their career perspectives.

#### **4 CONCLUDING REMARKS**

In brief, the empirical data presented in this chapter confirm the richness of the diversified publishing opportunities gained by the social representations literature, considering the 450 diverse indexed journals ranging across several thematic areas, and also theoretical and paradigmatic orientations in the 1492 articles (46% on the total of 3239 articles) extracted from 8740 publications specifically related to social representations and communication filed in the *SoReCom “A.S. de Rosa” @-library*.

However the results also highlight the paradoxical effect of geo-mapping the bibliometric impact of scientific production inspired by social representations theory in the form of articles published in indexed journals when it is compared with the geo-cultural dissemination of the entire corpus of the literature analysed taking into account the countries of the authors’ institutional affiliation. In fact, in the first set of data, based on the indexed journals, the dominant countries are the UK, the US and the Netherlands, while in the set of statistical results based on the entire worldwide production of the authors according to their countries of institutional affiliation, France, Brazil, United Kingdom, Italy, Spain and Switzerland become prominent.

Given the debate which still animates and divides the community of scientists and institutional leaders, differently affecting not only their personal careers but also their intergroup relations, and their personal, social and scientific identities, according to the discipline, the generational level, and anchoring in different geo-cultural contexts, our study – supported by empirical data – may stimulate meta-reflexive discussion and exchanges of views among the members of our scientific community on the preferred publishing options and collaborative strategies in the current editorial and academic scenario.

Also for the very well-reputed infometricians, “more research is needed into communication, publication and citation and evaluation practices in Social Sciences and Humanities (a “science of SSH”)” (Moed, 2014b) [35]. This is even more true in the era of the Science 2.0, characterised by the progressive computerisation of the research process which is going to deeply modify the research practices, also dominated by the intensive networking supported by the application of the technology to the science production and sharing: data-driven science, big data, open data, open access [17] 18] [19] [20] [21].

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