Review of the PhD dissertation:

"Academic social networks in the process of digital transformation of scientific communication"

"Academic social networks in the process of digital transformation of scientific communication" of Georgii A. Nikolaenko is an interesting dissertation that attempts to theoretically study the digital transformation of the scientific communication, analysing the geographical and disciplinary distribution of author profiles in ResearchGate, one of the most prominent scholarly social networks. The objectives of this PhD thesis is to understand the sociological roots of the scientific communication, the design of a theoretical model based on networks that explains this phenomenon and to empirically test this model using ResearchGate as example.

To this task the author structures the dissertation in two parts: a first section (chapter one) devoted to present different theoretical backgrounds that accurately contextualize and substantiate the proposed research. These frameworks allow the reader to understand the complex nature of the scientific communication and the important changes occurred by the emergence of internet.

Three main theoretical frameworks are the context of the research. The first one is the concept "Big science" coined by Dereck de Solla Price to explain the professionalization of science during the inter-war period and the consequent explosion of the scientific literature; the second one is the "field of science" by Pierre Bourdieu, which considers scientific communication as a competitive process where researchers fight for gaining visibility and prestige; and the third one is the "network individualism" by Barry Wellman, who describes an independent digitalized world where users create a new identity according to the online environment. These theories serve as context to interpret and understand the obtained results.

One of the most interesting aspects of this introduction is its particular point of view, emphasising the important contribution of soviet scientists to the development of bibliometrics and scientometrics. This exhaustive introduction points out the important role of Gessen in the sociology of science, Nalimov in the foundation of scientometrics

and, in general, the soviet science in the shape of the current science studies. However, the author delimits the evolution of the bibliometrics to the development of citation indexes in the 60s, omitting the contributions of Lotka, Bradford and Zipf with the first bibliometric laws. It could be recommendable to improve this perspective adding more details about the beginnings of bibliometrics. In line with this issue, the author shows a limited view of the bibliometrics as discipline with few theoretical background and exclusively oriented to research evaluation. This is exemplified in the distinction of "simple bibliometrics" (production) and "structural bibliometrics" (citations). I suggest to reinforce this view including mentions to bibliometrics laws, the relationship of bibliometrics with sociology of science (Garfield's historiograms, maps of science) and orher research lines apart from research evaluation (collaboration networks, co-citation analysis, databases evaluation, etc.). For examples, the Handbook of Quantitative Science and Technology Research or the Springer Handbook of Science and Technology Indicators could be a good starting point to introduce the bibliometrics. Another minor issues are, for example, that Google Scholar is an academic search engine whose working is different to citation indexes (i.e. Web of Science, Scopus), this causes lower metadata quality, but higher coverage of scholarly outputs. Altmetric.com belongs to Digital Science, not to Wiley or Taylor-Francis. This type of claims require citation.

The second part (chapter two) is addressed to display the quantitative analysis of ResearchGate profiles. Perhaps, this is one of the most highlighted elements of this dissertation, the availability to extract and process the whole list of ResearchGate users by country and discipline. More than 14 million of profiles were retrieved in several rounds, since October 2019 to the spring of 2021, with the aim of analyse the distribution of profiles according nationality and discipline. The results show that the network continues increasing its popularity with the detection of more than 4 million of new users during the initial and final sample. The important presence of profiles from non-occidental countries such as India, China or Brazil evidences the global dimension of this network and suggests that it could be used for accessing open academic publications. The longitudinal analysis confirmed the homogenization process in which the proportion of profiles by discipline is similar to other disciplinary distributions (i.e. scholarly bibliographic databases).

This empirical analysis is accompanied of a profound review of the most important studies about scholarly social networks and particularly on ResearchGate. This review enables to insert the results in a broader context and understand the real reach of the findings.

Unfortunately, the extracted samples do not contain quantitative metrics about the profiles, which would be valuable to analyse the impact and performance of the scholarly community. Even more, metrics about networking (i.e. followings, followers) and impact (i.e. RGScore, Research Interest, citations) could be used to test the theoretical arguments of Bourdieu about the struggle among researchers for obtaining visibility and prestige. In line with this, I would like to recommend my analysis on academic social networks (Social Network Sites for Scientists: A Quantitative Survey) where I formulate the theory of "Diogenes club" in which scholarly users employ the social networks to disseminate publications or be updated on recent studies, but not to engage with other users (see https://scholarlykitchen.sspnet.org/2016/12/08/guest-post-jose-luis-ortega-academic-social-networks-collaborative-environments-or-diogenes-clubs/).

Another limitation is that I miss a more detailed description on the technical functioning of ResearchGate. This influence the description of the metrics and the interpretation of their meaning. For example, ResearchGate not only indexes uploaded texts, it uses a crawler to extract bibliographic information from external sources such as repositories and databases (i.e. Crossref). In consequence, citations are extracted from the uploaded documents but also from third parties. The total amount of citations computed by ResearchGate is similar or even higher than WoS or Scopus (see https://doi.org/10.1007/s11192-017-2400-4, https://wlv.openrepository.com/bitstream/handle/2436/609261/ResearchGateArticles_preprint.pdf), therefore their bibliometric indicators are as valid as other classical tools. The explanation of h-index should be enlarged because it seems to be an indicator designed by ResearchGate, when it was proposed by Hirsch. I recommend to take a random sample of profiles and publications (50 or 100) and to compare their metrics in ResearchGate with their corresponding metrics in Web of Science, Scopus or Google Scholar, this would show in which proportion ResearchGate covers more or less publications and citations than other services.

In spite of these little limitations, the final result of this dissertation is greatly positive and should be considered a necessary and valuable contribution to the study of academic

social networks as new tools for the scholarly communication. The profound theoretical and historical analysis in the first part is an amazing introduction to the evolution of scientific communication, and the resulting evaluation system. The data sample and further quantitative analysis of the ResearchGate users in the second section is the most complete analysis done about the geographical and disciplinary population of ResearchGate. For these reasons, I recommend the highest qualifications to this doctoral dissertation.

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