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Nico Stehr
Karl Mannheim Professor of Cultural Studies em.
Zeppelin University, Friedrichshafen
e-mail: nico.stehr@t-online.de
ORCID: 0000-0002-4402-9679

Spaces of Scientific Knowledge

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Abstract. Perhaps the first and most pertinent observation that comes to mind when considering knowledge spaces is that scientific knowledge knows no boundaries. However, it would be naïve to assume that knowledge flow freely and without cost within or across borders. Indeed, distance may be largely irrelevant among the influences on the cognitive outcomes of scientific collaboration. The nature of the social and cognitive ties between scientists has a greater influence.

Keywords: space; distance; cooperation; knowledge production; capital endowments; Matthew effect

The authors, Agnieszka Olechnicka, Adam Płoszaj and Dorota Celińska-Janowicz, on the collaborative turn in science assert that "the impacts of scientific collaboration […] are spatially dependent" (Olechnicka et al. 2019, p. 127). In contemplating spaces of knowledge, perhaps the first and most pertinent observation that comes to mind is that scientific knowledge knows no boundaries. One salient attribute of scientific knowledge and characteristic of the social organization of the scientific community, for example, the norms of science, is the conviction that scientific knowledge, its cognitive manifestation and the institutional attributes of the scientific community know no borders and that scientific knowledge therefore is for all intent and purpose *global knowledge* (cf. Adolf and Stehr 2017; Meusburger, Livingstone and Jöns 2010). The fundamental condition for the possibility of collaboration across spaces is the mobility of knowledge.

It would be naïve, however, to assume that knowledge travels unimpeded and without costs within or across borders, whatever the nature of the boundaries that separate collectivities of scientists and individual scientists. As the economist Kenneth Arrow notes (in Stiglitz and Greenwald 2014, p. 507; my emphasis), although "knowledge is a free good. The biggest cost in its transmission is not in the production or distribution of knowledge, but in its *assimilation*". Knowledge is thus less transportable than physical equipment. With regard to the barriers to collaboration, members of close cognitive fields are more likely to engage in collaboration by limiting the transaction costs that increase with cognitive distance. The ques-

tion addressed by *The Geography of Scientific Collaboration* is more closely concerned with the organizational spaces of scientific labor. To inquire into the external and internal politics of science offers no resistance from the perspective of the science of science (*Wissenschaftslehre*). An examination of the spatial organization of scientific labor, in particular the density of scientific collaboration, along with its benefits, risks and costs, is an unfeasible aspect of the *sociology* of science. Whether the geography of scientific collaboration matters for science and science in society from the perspective of distance and closeness within science is a moot point. In the conventional understanding of the sociology of science, it is characterized by its ability to refrain from asking questions about the substance of scientific activity. The critical issue that promptly comes to mind is thus whether an examination of spatial patterns of scientific labor may *a priori* treat scientific knowledge as a black box.

The authors of the book under consideration do not exclude the possibility that the "collaborative turn" may be seen to promote a greater "sophistication of contemporary science" (p. 108) and constitute an exogenous pressure (p. 109) with an immediate impact on the cognitive attributes of scientific work. Collaborative research activities "enable new research objectives, accelerate knowledge production, and challenge practices of establishing the epistemic validity of science" (p. 1). Why, however, should the less traditional collaboration pattern of greater distance yield bolder results than the more proximate and more conventional pattern of collaboration? In what fields if inquiry might this be the case? Is the field of inquiry at all relevant regarding spaces of knowledge? Should this be the case, why exactly would *collaboration-at-a-distance* enhance the production of knowledge? It is nonetheless unclear whether collaborating at a distance or close quarters has the greater value for outcomes (p. 127–131). Distance may be largely irrelevant among the influences on the cognitive outcomes of collaboration. After all, the nature of the social and cognitive ties among scientists carries greater influence.

I will concentrate in my brief comment on the following issue: in what ways, if at all, the collaborative turn in scientific labor affects the generation of new scientific knowledge and the mobility of knowledge (cf. Jöns, Meusburger and Hoffman 2017); what the beneficial cognitive outcomes of the widening geography of scientific collaboration are; or, in the language of the authors: "the way collaboration impacts research outcomes" (p. 107). Collaboration-at-a distance is believed to foster "innovation and creativity […] in the sun of diversity" (p. 117); given that "the similarity of collaborator's knowledge, skills, and competences is so high that it inhibits innovativeness" (p. 117). The authors specifically list "synergy effects" and "collaborative advantages". Virtually all the specifications of the cognitive benefits of collaboration listed by the authors are not what I would call "immediate" benefits that bring a more or less direct impact on the substantive outcomes of joint hypothesizing or research. The detection of any cognitive gains from the

collaborative turn are difficult to establish or attributable to the collaborative turn. What characteristics would a quasi-experimental design possess that may help overcome such complications? In short, it is evident that the itemized benefits are difficult, if not impossible, to measure. As far as I can see, my query should focus on chapter 2, titled "Theoretical approaches to scientific collaboration from a spatial perspective". The ease and the efficiency with which spatially insensitive communication is possible today, compared to the political and technical restrictions in place just a few decades ago would appear to be a major factor in accounting for exploiting these new opportunities. This observation gives rise to the thesis that the geography of scientific collaboration (spontaneous/voluntary/deliberate/compulsory) has major *opportunistic* attributes, including the ease with which adherents, followers, citations and students may be recruited.

As far as I can detect, some of the explicit, albeit diffuse (direct and indirect), cognitive gains that are attributable to collaboration, are: (1) a greater objective status (by sheer numbers?) of knowledge claims; (2) the enhanced potential practicality of knowledge; (3) the enhanced assimilation of knowledge; and (4) synergies. The reported empirical results regarding the exact cognitive impact are marginal. Perhaps among of the overlooked benefits and attractiveness of the collaborative turn are "non-scientific" attributes and features of collaboration, for example, the simple appeal of social interaction across cultural, political, linguistic, and economic boundaries. What is missing therefore is an examination of the scientist as tourist. One of the great assets of the book is its faithful discussion of the full range of prior research on scientific collaboration. It would have been interesting to explore and perhaps quantify the social space between collaborators (actors) as determined by the volume and the differential composition of the capital, including linguistic capital, how they are able to mobilize in their social relations, engender differential attractiveness and how such relations impact the cognitive exchange and products (cf. Bourdieu 1986; 1988). Differential capital endowments should also affect the flow of collaboration across spaces of knowledge and acquire patterns of collaboration that resemble the outcome of the Matthew effect.

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