Debate 9 - Research as a geostrategic issue

Comments

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The current health crisis presents challenges for research. These come at a time when productivity gains resulting from research appear to be on the decline.

Challenges confronting research

The crisis, while focusing the public's interest in science, is adversely affecting research in several ways. These include a decrease in the international mobility of researchers, rising global tensions between countries that have a history of exchanging researchers and ideas and the temporary closure of labs.

Mobile scientists are generally found to be more productive than non-mobile scientists (Kerr 2019). Part of this advantage relates to selection (Borjas 1994) but the premium also relates to matching: mobile scientists are more likely to work in labs where their skills and knowledge complement that of others, leading to a productivity boost (Franzoni, Scellato and Stephan 2014).

Restrictions placed on mobility by governments have put a strain on the movement of scientists and ideas as have increased tensions between countries such as the US and China.

The closure of labs has led to a temporary halt in research where access to equipment, colleagues and animals play a key role in advancing research. In the United States most university labs were closed in a matter of twenty-four hours; many research animals have been euthanized. Researchers have been required to work from home.

E-communication cannot replace face to face interaction in knowledge creation. First, not all knowledge can easily be codified into a publication, embedded into an instrument or communicated by video. Knowledge which lies outside of these traditional means of transfer is referred to as tacit (von Hippel 1994). It is sticky, meaning that it does not easily move from its source of discovery. While e-communication can assist in the transfer of tacit knowledge, it is not a strong substitute for face-to-face interaction. For example, embedding CRISPR in a tool and widely distributing the tool has been shown to not solve the tacit information problem. (Thompson and Zyontz 2019)

Second, microgeography plays a significant role in knowledge creation, promoting the informal exchange of ideas and lowering search and execution costs (Catalini 2018). Microgeography is especially important at the initial stage of research. Proximity becomes less important once a research agenda is established.

Reasons why productivity gains resulting from research may be declining

The decline in productivity arguably relates to a decreased focus on research of a basic nature that has the protentional to be transformative but is risky and requires time to bear fruit. Industry engages in less basic research (Arora, Belenzon, and Patacconi 2018; Budish, Roin, and Williams 2015; Fleming et al. 2019). Funding agencies and the researchers they fund are arguably risk averse (Franzoni and Stephan, 2020). Agencies such as the ERC appear to be risk adverse, especially when it comes to supporting early-career researchers (starters). (Veugelers, Wang and Stephan, draft). Rewards to research discourage risk taking. Articles characterized as risky are more likely to appear in low-impact journals and take a longer time to gain recognition than those characterized as less risky (Wang, Veugelers and Stephan 2016). Research that follows the heard receives sufficient recognition for career advancement (Foster, Rzhetsky and Evans, 2015). Increased emphasis on short-term bibliometrics for hiring, promotion and the awarding of grants encourage this system. The emphasis on bibliometrics arguably relates to the importance universities, PROs and governments place on advancing their institution and country in international rankings. (Stephan 2012).

Arora, Ashish, Sharon Belenzon, and Andrea Patacconi. 2018. "The Decline of Science in Corporate R&D." *Strategic Management Journal* 39:3–32.

Borjas, G, 1994. The Economics of The Economics of Immigration. *Journal of Economic Literature, 32*(4), 1667-1717

Catalini, C. 2018. "Microgeography and the Direction of Inventive Activity." *Management Science* 64(9):4348-4364.

Fleming, L., H. Greene, G. Li, M. Marx, and D. Yao. 2019. "Government-Funded Research Increasingly Fuels Innovation." *Science* 364(6446):1139–41

Foster, G., A. Rzhetsky and J.A. Evans, 2015. "Tradition and Innovation in Scientists' Research Strategies," *American Sociological Review* 80(5) 875–908

Franzoni, C., G. Scellato, and P. Stephan (2014), "The mover's the superior performance of migrant scientists, *"Economics Letters* 122, 89–93.

Franzoni, C. and P. Stephan, 2020. "The meaning of uncertainty and risk-taking in science." Unpublished manuscript.

Kerr, W., 2019. *The Gift of Global Talent: How Migration Shapes Business, Economy, and Society*. Stanford University Press.

Stephan, P. 2012, *How Economics Shapes Science*. Harvard University Press.

Thompson, N. and S. Zyontz, 2019. "Decomposing the 'Tacit Knowledge Problem:' Codification of Knowledge and Access in CRISPR Gene-Editing." Unpublished manuscript.

Veugelers, R., J. Wang and P. Stephan, draft, "Does the ERC Fund and Promote Risky Research?"

von Hippel, E. 1994. "Sticky Information and the Locus of Problem Solving: Implications for Innovation." *Management Science* 40(4): 429-439.

Wang, Jian, Reinhilde Veugelers, and Paula Stephan. 2017. "Bias against Novelty in Science: A Cautionary Tale for Users of Bibliometric Indicators." *Research Policy* 46(8):1416–36