

ON CITATIONS

It is important to see the opaque relationship between a paper citations and its science. A known trend is that the more a paper is cited, the more citations it attracts, which stretches small gaps in quality into chasms into citation count. The process can also reward novelty above merit – in a preprint posted on-line the physicist Mark Newman of the University of Michigan in Ann Arbor models and measures the effects of “first-mover advantage” on citations, showing that it has no relation to the quality of the research. Those who are the first to publish in a new field are likely to garner more citations than those who publish later (M.E.J. Newman, preprint at arXiv:0809.0522v1 (2008)). “Were we wearing our cynical hat today, “he writes, “we might say that the scientist who wants to become famous is better off writing a modest paper in next year’s hottest field than an outstanding paper in this year’s...”

There are networks to consider analyzing every paper published in Proceedings of the National Academy of Sciences between 1982 and 2001. Katy Boerner who studies networks and information visualization at Indiana University in Bloomington, found that US authors are more likely to cite papers by workers at nearby institutions than from those on the other side of the country (K. Boerner, S. Penumarthy, M. Meiss, *Scientometrics* 68, 415, 2006). “People read widely”, she says, “but when it comes to filling the slot at the end of the paper, they also consider who they have to face again in the hallway or at the next conference”.

Looking at where people worked, the analyst Panzarasa looked at how specialized they were. Firstly he assigned researchers to disciplines by analyzing the keywords in their papers, and then he measured each author’s breadth of experience by looking at the fields of their co-workers. Social scientists are divided over whether specialization is the best strategy, he says. “It is beneficial for the productivity and earning, but there is also evidence from banking and academia that being a generalist pays off. “Panzarasa’s data show that the most highly cited papers were written either by authors who worked mostly with others in their own field or by those who worked with people in a wide range of other disciplines. But between these peaks lay a trough: papers that had authors from an intermediate number of disciplines were the most poorly cited.

“Being extremely specialized allows you to exploit the benefits of being embedded in your discipline, such as reputation, consensus building

and controlling the flow of knowledge,” say Panzarasa. “When you go to the other extreme you can take advantage of all the information coming from different pools of knowledge. But, if you are somewhere in the middle, you have less success – unless you feel you can manage very high levels of interdisciplinarity, it may be better to stay in your discipline.”

The most successful interdisciplinary authors, Panzarasa found, work with people who have independent authorship connections with each other, creating a tight social network. Panzarasa suspects that when these back-up connections between colleagues are missing, the person in the middle can flounder as they try to process too many information streams. But his analysis also found that highly specialized workers who broaden their focus slightly produce more highly cited papers, as do those that exploit what social scientists call brokerage: bridging communications gaps between researchers who don’t otherwise interact, and acting as a conduit for transferring knowledge from one field to another. Specialist brokers produced the most highly cited papers of any in his sample.