

## Why We Still Need Grant Peer Review

### SUBJECT CATEGORIES

Bollen et al. [1] propose a novel mechanism for allocating research funds that first distributes all available funds equally among all practising scientists and then requires them to transfer a portion of their annual funds to other scientists of their choice. This *distributed mechanism*, the authors suggest, will substantially reduce the cost of funding allocation, by making proposal drafting and reviewing unnecessary. A further advantage of the proposed mechanism is the creation of a rich dataset about links within scientific networks.

To evaluate their proposal, we can use Chubin's criteria for funding [2]: any funding mechanism should be *effective*, i.e. it should allocate funds in a way that promotes scientific progress. An important aspect of effectiveness is the *reliability* with which the mechanism makes comparisons between alternative potential funding options. Relevant secondary considerations include minimal cost and *accountability*, the appearance of effectiveness to external stakeholders.

A major worry about Bollen et al.'s mechanism is that it is not reliable, and therefore not effective. The possible funding alternatives, such as proposed projects or candidate researchers, can be assigned an evaluation of *scientific merit* [3]. Grant peer review *explicitly* attempts to evaluate this merit by relying on the expertise of practising scientists. The distributed mechanism would not include such explicit evaluation of merit. Therefore, funding decisions could be guided by other factors: friendship, collegial links, potential for

future research collaboration, and so on. Even in aggregation, such factors would not lead to a reliable evaluation of merit and the distributed mechanism will therefore be significantly less effective than peer review. Furthermore, this lack of effectiveness will be apparent to external stakeholders. If governments cannot trust that research funds are spent effectively, public science funding will likely be cut, or placed under the direct control of politicians and civil servants.

Several objections or adjustments could be made to address these concerns. First, it is possible to argue that grant peer review itself is not reliable. There may be good reasons to believe that the future merits of a research project or a researcher's career are simply not predictable. However, if that is the case, then a funding mechanism that distributes funds equally, or by lottery, would fare just as well, and with even less overhead than the proposal by Bollen et al. [1].

If, on the other hand, *some* prediction of future scientific merit is possible, the requirement in grant peer review to make such predictions explicit guarantees some level of reliability. In contrast, the distributed mechanism, where all decisions are made anonymously and without justification, makes no progress towards reliability. We could augment the distributed mechanism to increase its reliability by tracking the citation practices of scientists, and transfer money between individuals accordingly. However, such brute reliance on citation practices is likely to have a negative effect, as scientists will become even more calculating about who and when to cite. In addition, if citations were associated with funds, scientists would be strongly motivated to pursue review and method-oriented research, which garner higher citation rates, to the detriment of other avenues of research.

Another way to increase reliability is to require individuals to provide explicit justifications for their choices, to be scrutinised by a central monitoring agency or by their peers. While this may make the distributed mechanism as reliable as grant peer review, it will lose its purported efficiency benefits.

Even if the lack of reliability in the distributed mechanism may somehow be addressed, the mechanism itself raises several worries. The progress of scientific research relies on occasional episodes of “revolutionary science” [4]. These radical projects would be located on the periphery of the “funding graph” generated by the distributed mechanism. Researchers would end up transferring some of their funds towards more traditional research, but no funds would be flowing in their direction. Thus, it would be hard for the distributed mechanism to foster radical innovation, perhaps even harder than it is for grant peer review, which is often criticised for its conservatism and dismissal of radical innovation [5].

Like other network aggregation mechanisms, such as PageRank on the web graph, the distributed mechanism is likely to create super nodes, where the assigned value of the first few places vastly exceeds the assigned value of lower places. This phenomenon will manifest with a few “superstar scientists” receiving a much larger share of the funding pool than average. This will vest great power in the hands of very few, much more so than in the case of grant peer review where agency-provided funding is capped. It will be hard to avoid the scientific consensus drifting towards the views of “superstars”, which will in turn lower diversity, and ultimately may undermine the objectivity of scientific research.

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### **Conflict of interest**

The author declares that he has no conflict of interest.

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