

Judging and rewarding research and researchers: Beyond bibliometrics

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Contemporary evaluation of researchers and research is based on the number of publications, impact factors of the publications, h-index, RG scores and citation index, respectively. Statistically, these parameters rate the performance of research and researchers, but the quality of research might suffer in the race for these “bibliometrics”¹. This affects the innovativeness of the researchers.

Critically, research must be evaluated on novelty, the robustness of methodology, appropriateness of statistical methods and advancement of the current body of knowledge. Research should have uniqueness, objectivity and validity. There are frequent instances of repetitive research where only the location and researchers change, whereas the content remains the same. This is a wastage of time, resources and funds. This research is bereft of originality and objectivity. In light of the current scenario of the paucity of research funds, funding mechanisms need revisiting where innovativeness, societal impact, quality of science and long term benefits of research should be the new paradigms of research funding. Research must have wider applicability across disciplines and across geographical borders, instead of building islands of excellence.

Evaluation of research across disciplines based on the “bibliometrics” can be flawed. Medicine and bioengineering sciences might attract more researchers, publications, grants, and funding. The impact of other disciplines might suffer from the lack of popular interest in the contemporary context but their long term value cannot be evaluated through the current criteria. Research done in the developing world is conducted under difficult conditions due to lack of infrastructure, funding, mentorship and organizational structure. But this research might be more feasible, needful, applicable and impactful. It should be encouraged and recognized through collaborations and capacity building to improve competencies. This will foster global teamwork breaking geographical and intellectual barriers. Similarly, researchers in the developing world are not able to publish in high impact journals due to publications costs, connectivity and accessibility to library resources. Research published in open access resources should be given high weightage provided it is subjected to intensive content-based peer review. Research evaluation must check and discourage publication in predatory journals which are undermining original and creative research.

Researchers should be evaluated on the originality and novelty of their research. The consistency shown by a researcher in communicating his research through publications over a period of time is an important criterion of evaluation. The body of work created by a researcher over a period of time that has moved the research field forwards must be a criterion for evaluation. Collaborative spirit in research through building interdisciplinary teams and group efforts reveal the people skills of the researchers. This team spirit across countries and continents which synergizes the core competencies of each team member making research more impactful should be a factor in evaluation. Research methodology must be explicit and data disclosure must be made mandatory followed by open access to peer review process post-publication. These steps will improve the objectivity of evaluation of the scientific contribution, the prowess of researchers and discourage redundant research. Conflict of interests in research should be a criterion in the evaluation process.

Overemphasis on publications can affect the success of young researchers in winning research grants even if their research proposals have fresh ideas and new techniques as late-stage researchers will be unfairly advantaged.

Researchers' contributions to the society and community in the form of reviews for journals, research supervision, field work, and community outreach should contribute to the evaluation process. Communicating science to the society makes the society more aware and enlightened leading to indirect benefits to mankind. Public engagement makes research more meaningful and can open fresh perspectives and ideas for research. Publishing popular articles and policy documents should be credited. Risk-taking abilities in research, as well as reporting of negative results, should be recognized to encourage innovation.

Research should be rewarded through increased and extra funding to carry forward the body of work in the realms of innovation and improvement. The geographical spread of the research to build new teams should be a reward. Researchers spend the prime of their youth in their laboratories and fields in the quest for intellectual satisfaction. Good researchers must be financially rewarded so that finances never remain a concern to distract them from the path of research excellence. Rewarding scientists for the work that brings changes in society bridges the gap between science and society. The personal satisfaction and societal recognition is in itself a reward. Public communications by researchers must be rewarded financially as it helps to attract new students to research, impress funding bodies, building research networks and foster new collaborations. Researchers should be given wide media publicity, especially on social media. It boosts their self-esteem and ensures government and industry support for the research institutions.

Scholarships and endowments in the name of researchers in high schools and colleges is a way of recognition and stimulating research temper in the next generation. Frameworks need to be built to assess impact assessments of research done by researchers that should be given more weightage in the evaluation process. This approach will explicitly document impacts and will be endorsed by the funding agencies leading to recognition and prestige. This will further help researchers to anticipate and establish research partnerships for higher impact studies². Societal impact evaluation of research and researchers will make their connections with industry and funding bodies clearer, goal-oriented and more applicable. This will further improve the evaluation process. Travel grants for collaborations, improving skills and for the strengthening of laboratories can be the other ways of recognition.

Evaluation and reward criteria for research and researcher needs to change in the context of changing funding patterns for research, higher attrition rates of researchers from academia to industry and increased public awareness.

1. Hicks, D., Wouters, P., Waltman, L., De Rijcke, S. and Rafols, I. (2015). Bibliometrics: the Leiden Manifesto for research metrics. *Nature News*, 520 (7548), p.429

2. Reward research that changes society (2018). *Nature*, 553 (7686), p.5. doi: 10.1038/d41586-017-08943-6