

# 15 Research Quality and How to Find It?

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Darwin spent 30 years analyzing data obtained during the Beagle expedition and he later published his work in the book *On the Origin of Species* in 1859. This 30-year time gap between data collection and publication is not quite aligned with the hypercompetitive publish or perish mentality of the current mainstream of science. According to one study, for the most prolific researchers (who publish an article every 5 days), the real motivation is not to disseminate one's science but to win more grants or acquire more direct financial incentives. One example of this was the controversial policy of the Chinese government paying cash to researchers who published scientific manuscripts, with extra incentives for publications in well-respected journals. But how do these policies affect the quality and reliability of the research? Is there a way to reward research and researchers without corrupting the system and promoting poor quality publications?

## **Perverse policies or perverse researchers?**

One policy commonly adopted worldwide is to reward researchers with an increase in salary or a promotion based on the number of publications. The idea behind this is to stimulate productivity of researchers. Unfortunately, these policies may also increase the rate of substandard publications, falsification of data, and fraud in publications. With these incentive-based policies, there has also been an increase in organizations that help researchers with the publication process. Some companies offer the option of writing the complete paper and there are other cases where these companies had manipulated the peer-review process in journals by fabricating fake emails to well-known researchers. However, these types of policies also occur at different levels of the research and publication process. In one example of fraud at the journal level, the journal opened the scope and increased the single-author publications, the editorial board have no expertise in those diverse topics and when it was banned, published several issues to get as many articles as possible published before the ban was effective.

## **How did the policies become perverse?**

Some literature links the decline in research quality with the overall reduction in grant funding from organizations like the National Institutes of Health. This decline in funding induces a pressure to reduce the time spent analyzing data and developing more elaborate ideas, towards more short term goals and projects. This pressure

affects all the researchers, even the most prolific. One study found that the driving forces for hyper prolific researchers are the fear of the publish or perish mentality, financial rewards, and promotion to tenure. That is the reason other initiatives to promote research quality are perverse. For example, rewarding researchers based on the number of citations is perverse because of the increase in the reference list and self-citing. Another measure of quality is the number of grants acquired. This policy results in an increase in the time researchers spend writing and reviewing grant proposals, focusing more on the quantity of grants and not on the quality. This also suppress creativity and original thinking and forces them into short term thinking.

### **How can the system be improved?**

The reward system should be improved at all levels.

At the funding agency level: increase the amount of funding, strengthen grand review panels and review systems, invest resources in creating more meaningful metrics and not eliminating the actual panels but reduce their importance in decision making. For example, some researchers are moving to Journals that do not use Journal Impact Factors because of the bias towards English language.

At the university level: Promote an open discussion about ethics and highlight corruption to learn from mistakes. Strengthen the academic programs with responsible conduct of research courses at undergrad and graduate level. PhD programs should build character and prepare students to service humanity through science, encourage leadership, teamwork, project management, communication skills and mental health. Also, inform the students about other career paths available besides academia. For example, science policy, administration, law, scientific writing, science curriculum and other non-research careers that currently receive less attention from the universities.

At the researcher level: consider that researchers should be evaluated and rewarded according to a balance between successful trainees and publications, based on all the achievements of their careers and establish different categories for junior researchers. At the publishing level: some initiatives to tackle these problems are to promote open access journals and preserve localized publications. In general, reward academics that use open science, open access journals, and open science clouds that allow researchers to compare, analyze, and discuss data.

At the policy level: it is important to create an environment that promotes interdisciplinary and collaborative work and through the improvement of the facilities and the support for data sharing and reproducibility platforms, make it possible to cultivate a vibrant intellectual interdisciplinary and diverse community.

The unethical practices in science decrease the general public respect and trust in science and generates a broken legacy for future generations. For that reason, it is necessary to think of a new way to reward the researchers for their contributions to science. To combat unethical practices, it is important to increase the investment in science rewards, promote ethical practices in all the institutions and in all levels, as well as create free access to platforms and reward the use of those that facilitates reproducibility. Finally, rewarding faculty and young researchers will reduce fraud and favor an environment of quality over quantity. By instilling these programs, the judging and reward policies in sciences will facilitate better profits and generate knowledge that will be the most reliable and useful for humanity.



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