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This article features a conversation between two senior Principal Investigators (PIs) on the impact of the size of the research team on research output. The two senior PIs in our discussion are Dr. Kelly Lim, a biomedical researcher, and Dr. Liufei Wang, a chemist.

Kelly: Liufei! So good to run into you. Congratulations on your latest publication. I heard it's making waves in your field.

Liufei: Oh hello Kelly! Thank you so much. Yes, we are delirious with the attention our paper is finally getting. It was an ambitious project, and we were a small team. How is your research going?

Kelly: Oh, well, I am working as part of quite a large group at the moment. We are processing some preliminary data results, but with so many people in the project, it is slow going.

Liufei: It must be exciting to be part of such a large project though. Did you hear about the LIGO experiment? One thousand authors and a Nobel Prize. It seems like a big team can achieve some fantastic results!

Kelly: It's interesting that you mention it. Have you heard about the study that experiment inspired? A group of researchers looked into whether a large research team or a small research team is best to produce disruptive, or innovative, research.

Liufei: Oh, that is quite interesting. If LIGO inspired them, then inevitably they found that large teams are the most disruptive.

Kelly: They found the opposite. Small teams of researchers produce disruptive research, while large teams develop that research. They looked at scientific publications from the Web of Science as well as patent filings with the USPTO and software developments from GitHub in their analysis. It was very comprehensive- they reviewed everything from 1954-2014.

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Liufei: That is surprising! How do they explain that result in the context of LIGO winning a Nobel Prize?

Kelly: I found their methodology quite interesting. They looked at the citations in each paper to calculate "disruption." So, for example, if someone citing your study also went back and cited the authors whom you cited, your research is not considered disruptive. However, if someone only cited your study, your work is innovative.

Liufei: I see. So if someone cites my work as the foundation of their argument, then my work has changed the scientific conversation. In other words, I have proposed something new and taken the field in a different direction.

Kelly: Right. But if they cite all of the authors you cited, then your work is merely building on what is already established- an incremental improvement. The study found that large research teams are much more likely to produce these types of incremental improvements, even if they do so with a larger pool of data or flashier methods.

Liufei: So, is it true in your experience?

Kelly: I think so, yes. My current team is about 300 people. We made our funding bid to develop on a recent discovery in the field and won a substantial grant from the NSF. In the past, I've been in smaller teams that tried to get similar funding for projects, but it's much more difficult. Funders really favor large teams whose research builds on something already demonstrated, because it's likelier to have a successful outcome. I like working on a large team because we can learn so much from each other, but sometimes it is challenging because new ideas are not always appreciated.

Liufei: There is much more freedom in working on a smaller team. We have to do a lot more work, but everyone's voice is easily heard, and anyone can propose new ideas. It's easy to take the project in a risky direction if you only need to convince a few people. My latest paper is a good example!

Kelly: Exactly. Even in the context of LIGO, it's still true. Einstein's theory of relativity is the basis for LIGO. There was only one author of the original paper- Einstein!

Liufei: An excellent point. It's just like that Jeff Bezos quote. "If you can't feed a team with two pizzas, it's too large."

Kelly: Ha! I don't know about that. I think there's a place for small and large teams- we have to make sure that both receive funding so that innovative research can continue. Ah- I'm so sorry, look at the time! I must meet one of my students.

Liufei: Great to see you. Bye!

The study shows that small teams are more inclined to produce innovative research than large teams. However, large groups are needed to do meaningful work in research development. Hopefully, this study will push for a more balanced funding approach to ensure that science continues moving forward.

Are you a part of a Large or a Small research team. Share your experiences and thoughts in the comments section below.

Category

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