Small groups produce more impactful research

RESEARCH is an investment. Over the years, research has generated new knowledge and technologies. In order to get the best value from research, many agree that they must be impactful.

A widely-held view among policymakers and funding organisations is that research conducted by large multidisciplinary groups (where experts from different fields work together on a common subject within the boundaries of their own discipline) are more impactful compared to those done by small and single disciplinary teams.

But this view is now being questioned, as recent studies appear to suggest that research conducted by the latter are in fact more impactful and can be highly disruptive.

Two independent new studies show that large multidisciplinary groups are less likely to generate high impact and disruptive research. According to one of the studies, a group of five or less and from a single discipline led to the most disruptive technology in the long run. The conclusion was derived from a study of more than 65 million papers, patents and other publications from 1954 to 2014. According to James A. Evans from the University of Chicago who led the study (published in Nature), as the teams grow from one to 50 members, a high drop in scientific disruptiveness was observed. He said that smaller teams have more to gain and less to lose from disruption as they tend not to build on previous works. This forces smaller groups to explore possibilities that “don’t gel with but could disrupt” current science and technological trend.

On the other hand, large multidisciplinary groups tended to create disagreement within the groups. This reduces the number of ideas and, as a result, steer members towards common ideas which are less disruptive.

The researchers noted that Nobel Prize-winning works are among the most disruptive while review papers are among the less disruptive. They also found that solo authors are more likely to be highly disruptive than a team of five, and that teams of 10 or more are even less likely to be disruptive.

As reported in Physics World, an economist at Massachusetts Institute of Technology (Sloan) Pierre Azoulay who was not involved in the study commented that the time is right to end the collaborative fetish.

“Enough with funding mechanisms that predicate funding on collaboration of this kind or that kind,” said Azoulay. “There is nothing wrong with collaboration, but there is no reason for policy makers and funders to think that they can engineer collaboration in ways that are necessarily going to be wonderful.”

Another study done by Al-Shebli, Rahwan and Woon at Khalifa University in Abu Dhabi showed that multidisciplinary groups are not the best to conduct impactful research.

The study looked at five types of diversity — ethnicity, gender, discipline, affiliation and academic age. The researchers studied more than nine million papers, patents and documents, traced their impact through the number of citations received, and found that ethnic diversity is the strongest predictor of scientific impact.

Based on these two independent studies, policymakers and scientific funding agencies in Malaysia should reconsider their funding policy, which tends to be partial towards large multidisciplinary research teams.

There is no strong evidence to support the veracity of the claim that large multidisciplinary research groups are the most effective research structures.

In fact, this approach may lead to the formation of artificial groups, resulting in less impactful and less disruptive research.

It is time to revisit the current policy which has overemphasised multidisciplinary, interdisciplinary and transdisciplinary research.

Funding agencies should also give priority to small and single disciplinary research groups, which are potentially more disruptive and impactful.

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