

these theories and a clear understanding of the impact of algorithms on the available data, researchers will not be able to draw meaningful conclusions.

Yet another complicating factor for computational social science is that large data sets are often the private property of commercial enterprises. Academic scientists need to liaise with corporations to obtain access, and this might introduce even more bias. This is partly because, for companies, data are valuable – and therefore sharing data is a risk to their bottom line. That is among the reasons why firms tend to restrict what they share, as Jathan Sadowski at Monash University in Melbourne, Australia, and colleagues highlight on page 169. But in light of the potential of these data to provide societal benefits, companies – together with academic researchers and public bodies – need to engage with these questions and set standards for quality, access and data ownership.

Ways forward

There are ways to obtain useful and reliable data, as Mirta Galesic at the Santa Fe Institute in New Mexico and colleagues describe on page 214 in an article on ‘human social sensing’. This is the study of how individuals gather information on others in their social networks. For instance, researchers could predict a swing in political opinions by interviewing people and asking them what their friends are talking about. Gathering data about people from other people can help to avoid some of the biases seen in self-reported data, and has the added benefit of generating anonymous data: the researchers never need to know any personal or sensitive details about the people on whom they are receiving information.

Another area ripe for growth lies at the intersection of infectious-disease modelling and behavioural science. As Caroline Buckee at the Harvard T. H. Chan School of Public Health in Boston and colleagues argue on page 205, an accurate model of contagion and infection requires researchers to understand the cultures and behaviours of people who have been – or might be – infected. It is hard to predict a disease’s path without considering these and other social aspects of transmission. Structured and widespread collaborations cutting across disciplines are key to achieving this.

The pandemic has shown that lives can be saved when large-scale data sets are harnessed for science. This potential is only starting to be realized as researchers with backgrounds in computer science or applied mathematics join with social scientists. These relationships must deepen and expand to encompass researchers in more fields – such as ethics, responsible research, and science and technology studies – to ensure that we avoid known pitfalls and that we use these data in a way that maximizes gained knowledge and minimizes potential harm.

Transdisciplinary co-working is rarely easy, but it is essential for both better decisions and robust outcomes. *Nature* is committed to fostering this conversation and helping scientists to learn each other’s languages so that, together, researchers can make more progress on some of societies’ most pressing problems.



Research managers are becoming advocates for responsible research.”

Research managers are researchers, too

Academic administrators have a key part to play in improving research culture.

In the space of three decades, academic research management has become an attractive career prospect for researchers around the world. Once focused principally on helping academics to manage funding, research managers and administrators (RMAs) are now part of a globally recognized profession that spans the research spectrum. There are some 20,000 RMAs working in universities; most are in high-income countries, but expansion is under way in lower-income nations, particularly in Africa.

The role has evolved as research has become more complex, and this, in turn, is attracting more candidates with research-level qualifications and experience. Today’s managers and administrators need knowledge and experience of open science, equality and diversity, ethics and public engagement – as well as of more conventional areas such as accounting, project management and research policy.

RMA courses and qualifications are now offered by universities and by some of the 20 national and regional professional associations belonging to the International Network of Research Management Societies (INORMS).

But, as we report in this issue (see page 321), tensions between RMAs and the researchers they work with are not uncommon. There are still those who regard the academic as ‘king’ and the RMA as little more than research support. Meanwhile, at some institutions, university leaders expect RMAs to monitor academics’ performance metrics – such as targets for publishing and research income – which can be stressful for both researchers and managers.

As a result, RMAs and their professional organizations are becoming advocates for responsible research. And they are embracing the academic study of research management and administration. This is helping to establish good practice, as well as professional standards that can be used to hold universities and publishers to account.

For example, members of INORMS are taking a lead in addressing how university league tables might be improved to make them fairer and more transparent. And the UK research managers association, ARMA, has been involved in an independent review on the use of metrics in research evaluation, a project called the Metric Tide. This year also saw the launch by management professionals of the *Journal of Research Management and Administration*.

These are welcome developments. RMAs are crucial to the research enterprise. Moreover, their involvement in active scholarship is essential to achieving the aims set out above. Researchers and managers must work collegially and respectfully to make the research environment happier and more productive.