

# Keynote at [Pujiang Innovation Forum](#) [2024](#), Shanghai, China. 2024-09-08

*This text reflects a combination of what I planned to say, and what I actually did say at this event.*

Thank you for the invitation to speak. I am a professor of cognitive science, at the University of Sheffield UK, where I research and teach the psychology of decision making. I am also involved in University policy and strategy around research culture, hence why I have been invited to speak here today.

I do not know about Chinese Universities or research and innovation. I hope I can learn more from you at this Forum. So, since I cannot tell you about your situation, I must speak about British Universities, and some concerns we are currently addressing.

The model for British universities is based on the seven ancient universities which were established before the industrial revolution. In this model, Universities and researchers have a lot of independence from government, and few obligations. Research is done in a spirit of friendly competition, but it is not richly rewarded. Many of the great scientists we learn of - such as Charles Darwin - were already rich, and that is why they could afford to spend time on research. And Universities were hybrid institutions, where teaching and research both occurred.

Many still hold this model in their imagination, but British Universities have continued to change. There are more Universities. Now there are over 150 Universities in the UK. Half of school leavers go to University. We teach five times as many students as in the 1960s. There are more demands from government. The competition in research is not always friendly. Some things are the same though - we still teach and research. And we are still not richly rewarded.

Pressures on UK researchers have increased steadily. Researchers are now expected to be more professional, to teach more, to win more grants and publish more papers. Some of this is because of the growth in activity in the University sector, some of it is increased demands for results from government, which wants to results from investment in research, and some of it is from market competition within and between Universities. The pressures listed here are probably familiar to everyone working in research around the world. Many UK researchers feel these pressures acutely. They worry about the amount of work they have to do, and the security of their jobs and career progression. They do not have a lot of spare time to think about innovation, or improving the way they work.

Some of the pressures on UK researchers are a result of how we have previously tried to improve research. It is natural to try and improve research by counting the quantity of outputs - such as papers or grants won - but any measure can become a target which excludes the true

values that the measure is meant to reflect. These are called perverse incentives - creating papers written for the sake of being published, grants won so someone can be promoted - which undermine the quality of research done rather than being part of quality research.

To address this challenge, there are a number of ideas and initiatives which are current in the UK and which I would like to share.

**"Responsible Metrics"** is the idea that the mechanisms for assessing quality in research can be designed to protect against perverse incentives. Too often researchers have been evaluated by metrics which are inappropriate for individuals (such as journal level metrics), are inappropriate for their field or unfair (such as some metrics calculated and owned by commercial publishers). My colleagues in the Research on Research Institute have published this report which has a useful checklist for how to make metrics responsible. More and more people in UK research now recognise the dangers of irresponsible metrics and the harm they do to researchers and research and innovation quality.

The **national research assessment system** in the UK is called the REF - Research Excellence Framework. It is a huge effort which occurs approximately every seven years - nearly all University departments have the quality of their papers and academic life assessed by independent panels. The next REF is in 2029 and the big news is that there will be an expanded section - perhaps 25% of the assessment - on People Environment and Culture, reducing the attention to research outputs. This is already changing how Universities work. In anticipation UK universities are investing in work which shows how they support those doing research.

The changes to the REF are a response to the widespread perception that UK research assessment has been too narrow in the past and this has allowed research quality to suffer and degraded some aspects of University life. An important discussion in the UK is around **reproducibility** - which is roughly the idea that research must produce findings which can be repeated, either to test and expand on them, or which can be relied upon in a new context.

Too many results across biomedical science, social science and even engineering are unreliable or overclaimed. I am a part of an organisation called the UK Reproducibility Network which supports institutions and researchers to focus on processes which support better quality research. There are a growing number of such networks around the world - now 20 globally.

A key focus of work on reproducibility is **open research** - which is the idea that the materials, analysis and reports of research should be openly available. For research paid for by the public, there is a strong claim that the outputs should be openly available to the public. Transparency around how research is done is also a good medicine for various diseases such as research fraud or selective reporting which distort findings. It acts as a signal of trust. Opening the details of your research says "look! I have nothing to hide about how this work was done"

**Open Research can also support faster and better innovation.** Research can be very slow. It relies on many details, and sometimes without the right information reusing or adapting a

piece of research is very hard. Sharing what is involved with research supports transfer of research findings. There are concerns around commercialisation and privacy - especially in engineering and medical fields - but these should not be an excuse to avoid all aspects of transparency in research.

The key idea for supporting higher research quality - and this means research which can support innovation and the greatest benefit for society - is to **change focus from the outputs of research to the processes**; to focus on supporting researchers rather than only counting research.

Universities produce **talent and training**, as well as research. One route to innovation is through commercialisation of University led research. But a second, less visible route, is when those who have worked in research and acquired valuable research skills and perspectives leave University research. A report from the Royal Society - founded in 1660, the oldest scientific society in the world and publisher of the first scientific journal - from 2010 showed how few people on a research training pathway ended up a permanent professor in the UK: less than half of 1 percent. This is not a failure! Across UK society you find people with research training who bring these skills to innovation in their sector.

Finally, I will briefly mention **metascience**. For ideas like open research or responsible metrics it is not enough to claim they will help, we need to commit to formally evaluate their effects. Shanghai has a long tradition in the science of science. In the UK we are catching up - the UK government has recently established a Metascience Unit to run experiments on the best methods to support research and innovation.

I am part of the Research on Research Institute and there is lots of exciting work on how research can be made more reliable, efficient, fairer and better support innovation. I would be delighted to talk to any of you about this while I am here and learn more about the Chinese research and innovation system. Next year, in London, we are helping organise an international conference on Metascience and it would be wonderful to have more Chinese speakers there

Thank you

*Slides, including outgoing links and citations, are at [tomstafford.github.io](https://tomstafford.github.io)*