Scientific work: success and precarity in today's knowledge economy

Sarah Dyer
Geography Department, School of Environment and Development

Introduction

As part of a wider 'knowledge economy', science has enormous strategic importance for post-industrial economies such as the UK. Universities too are central to building a profitable knowledge economy and are being reconfigured in the process. Academic scientists increasingly engage in context-driven and problem-focused work including industry collaboration and multidisciplinary project work (what is called 'mode 2' science) and funding bodies require 'value for money'. The growth of spin-off companies signals the rise of not only the entrepreneurial university but also the entrepreneurial scientist (Lam, 2007). As a result science has become infused with new economic rationality and some scientific norms and practices altered in the process (Mirowski, 2004, Mirowski and Van Horn, 2005, Rajan, 2006).

This reconfiguration of the relationship between science, government, and industry affects scientific labour markets and plays out differently for different scientists. Success as a scientist is never exhaustively determined by scientific criteria (Collins, 1985, Jasonoff, 2004). Workers are needed to provide the flexible workforce of 'mode 2' science and post-doctoral researchers often become 'trapped' (Lam, 2007, Smith-Doerr,2006) as they are unable to acquire the necessary scientific capital of first authored papers and external research monies, creating "a burgeoning 'under-class' of contract workers" (Scott,2007: 208). These processes add further complexity to pre-existing patterns of labour market segmentation.

Figure 1 Cartoon from Union campaign

This research examines the interplay of employment terms and conditions, professional identities and ethics, and the production of knowledge in contemporary science.

Aims

To contribute to understandings of contemporary science and scientific labour markets.
To identify advantages and risks of current organisation.
To engage with scientists and contribute to their understanding of their working life.

Methods

Semi-structured interviews with 30 people with PhDs in science working at all levels in academic science, some who had launched spin-out companies, and some who no longer work as scientists.
Subset of interviewees who took photos during their working day which were discussed during their interview.

Results

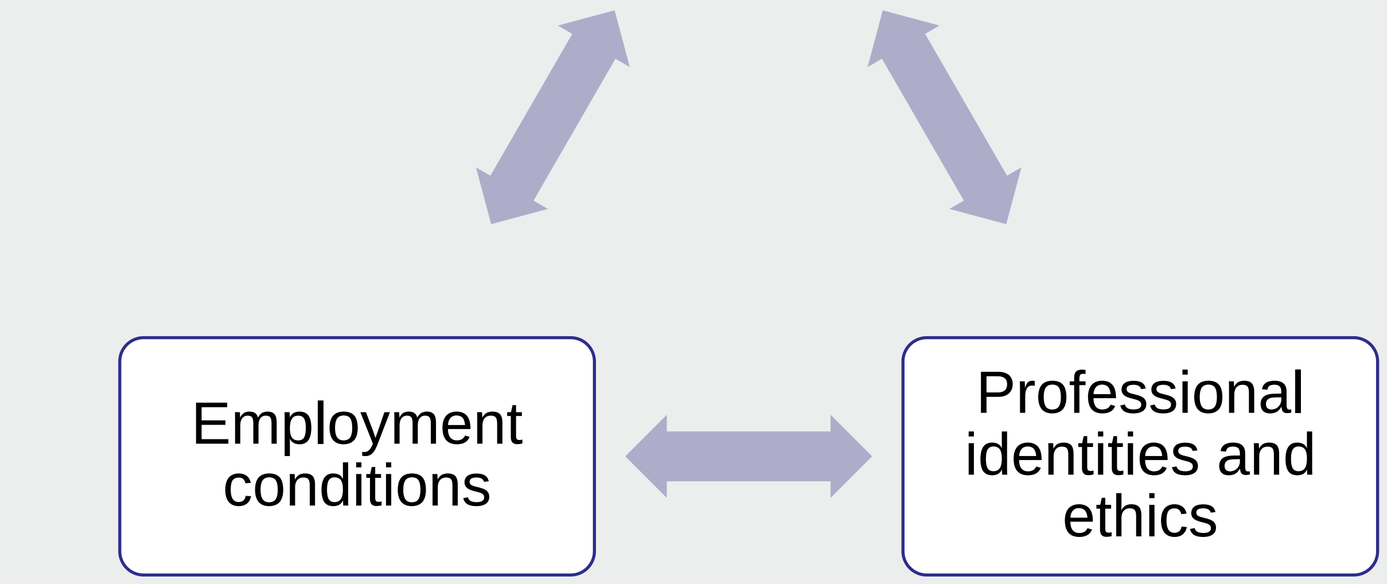

Figure 2

Some conclusions

1. Science as intellectual vs craft labour
Historians of science have documented 'invisible labour' (work that is unrecorded and unrewarded) in science since the days of Boyle (Shapin 1989). In contemporary Mode 2 science there is less invisible labour. Authorship lists are long, for example, recording all those who have contributed to a paper. However, scientists make distinctions between 'real' science and the rest, which reflects and enables a division of risks and rewards. 'Real science' is the craft labour of bench work and experiments.

PIs say things like:
To a certain extent, a lot of what I do now is that (reading and writing). So I read up on a new area and I enjoy that. I also enjoy writing too. So it's different. I wouldn't go back. I once thought I would never give up science because I enjoyed experiments so much. But there's a lot of mundane, routine, boring drivel with that too. I also like being in charge and I like having more control. (Senior women scientist)
Of course I don't do anything myself anymore. I live vicariously through the students and the postdoctoral staff. Literally it's been years since I wrote a computer programme to actually do something. So instead I run our group meetings. I provide paternal advice on research. I get the money. I go to these international project meetings, fight for our stake in the project. The way I see it is I try to create the opportunities for my students and post docs to do real things. But I don't do real things anymore. (Senior male scientist)

Oddly, it is not 'real science' that makes careers and is rewarded with permanent jobs and respected reputations but other intellectual work (interestingly work whose outcomes are more mobile (in authorship) and translatable (into grant money)). 'Real science', skills and expertise in craft science, are less well rewarded and less sustainable than they could be. Scientists talk about the difficulty for those who undertake the servicing work that makes science possible (such as maintaining software and equipment). There is only a precarious career path in this kind of work.

2. Community and autonomy
There is some evidence that mode 2 science is reconfiguring the scientific peer group. It isn't clear if scientists employed in the secondary labour market of 'postdocs' are members of peer groups or not. For example, a scientist with a permanent post argued:
I think the peer review system works well if those people doing the review are themselves in a rather comfortable position. So you've got a permanent job, you've got your research funding and everything is working well, you don't have any threats, then I think you can touch other people's work in an objective way without putting your emotions and needs and desires into it. As soon as jobs become uncertain . . . post docs are our reviewers often and PhD students can be asked to do review as well. Because there are too few people to do refereeing. And these people are not really in a position, I think, to give an objective review.

Figure 3 Photo by research participant

References

Collins, H. M. (1985) Changing Order: Replication and Induction in Scientific Practice, Beverley Hills & London, Sage.
Jasonoff, S. (2004) Ordering knowledge, ordering society. In Jasonoff, S.(Ed.) States of knowledge. New York, Routledge.
Lam, A. (2007). "Knowledge networks and careers: academic scientists in industry-university links." Journal of Management Studies 44(6): 993-1016.
Mirowski, P. (2004). The effortless economy of sceince? Durham & London, Duke University Press.
Mirowski, P. and R. Van Horn (2005). "The Contract Research Organization and the Commercialization of Scientific Research." Social Studies of Science 35(4): 503-548.
Rajan, K. (2006). Bio-capital. Durham, NC, Duke University Press.
Scott, P. (2007) "From professor to 'knowledge worker': Profiles of the academic Profession". Minerva, 45, 205-215.
Shapin, S. (1989) "The Invisible Technician" American Scientist, 77, 554-563
Smith-Doerr, L. (2004) Women's work. Gender equality vs hierarchy in the lifesciences. Boulder, Colorado, Lynne Rienner Publishers.