Opinion

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Freelancer

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Although still two years away, my looming "retirement" from university employment is inevitably going to herald a major change of life. "Of course, you'll become '*Emeritus*'", most colleagues have opined. My answer to all of them has been a firm "No. I'll become a freelancer". The concept of a freelance scientist is obviously so alien to most of them that they invariably change the subject immediately. However, my gut feeling is that in 20 years or less, almost all of us will be freelancers of some kind.

The COVID-19 pandemic has altered the world of work in very obvious ways. There has been much talk of how the changes are likely to carry over to the future, even if more traditional patterns will probably reassert themselves in the short to medium term. Working from home, conducting meetings remotely, not wasting days travelling between continents for a few precious hours of face-time and being free to structure workdays around our own priorities: these are the most obvious novelties that many believe will continue long after the effects of the pandemic on health and wealth have faded. But I have a slightly different take.

Major disruptive events of worldwide import—world wars, global economic slumps, cataclysmic volcanic eruptions and pandemics—have often been harbingers of profound social change. This is not only due to their direct and immediate effects, but more so because the disruption accelerates and facilitates changes that were already happening. In the case of COVID-19, one may place in this category the demise of cash, the rise of streaming services in place of live entertainment, online grocery shopping and even virtual dating. Another is paying people to stay home and do nothing, otherwise known as the universal basic income (or, in the USA, "stimulus cheques").

Inefficient practices in academia are equally ripe for change. Why bother with classes for 500 first-year students when a much better edition of the lecture by an expert communicator is available on the internet? What's the use of an ageing PhD advisor 20 years away from bench science, who struggles to guide the next generation of experimentalists in the lab, when the expertise of a plethora of specialists can easily be accessed online? What's the value in published papers that are read by fewer people than wrote them? Or in seminars delivered to a roomful of attentive postdocs and PhD students who lack the courage or the time to address even a single question to the speaker?

Yes, there is still great value in small-group teaching and mentorship, in the creative verve of a close-knit laboratory team, and in good writing and oratory: but the required skills are already different from those in which we were schooled. Thus, even if I do not hold in my palm the crystal ball to predict exactly which changes will happen and how fast, I believe that our traditional jobs are going to melt away very fast in the post-pandemic world. Universities and research institutes may still exist, but I expect that their practices will be different, reshaped by rational need more than by tradition. Today's academic science is already quite unlike that of 1920, but it has evolved so slowly during that century—spanning a much longer time period than the lifetime of a scientific career—that we barely perceive the changes that have occurred. In contrast, the changes now afoot will certainly happen much faster, especially since the funds to support the current "inefficient" model are likely to diminish rapidly.

So, I predict that university teaching and science communication in general will be the first to evolve into freelance activities, where universities will invite bids from individuals or their agents and award commissions on a fee-paying basis rather than using salaried employees. But these are not the only component parts of academia facing such a shake-up. The practices of laboratory science are also likely to be rebuilt. When discussing with colleagues how research might be undertaken on a freelance basis, they usually raise issues such as bricks and mortar and the complex infrastructure that is needed to sustain cutting-edge research, especially in the life sciences: how, they ask, could a freelancer access state-of-the-art imaging, mass spectrometry or DNA sequencing? How could their acquisition of such expensive hardware possibly be financed, especially if they had to somehow acquire it personally and set it up in the garage or carry it around with them?

But the answers to these questions are already evident in the practices of some major research agencies, most notably in Europe's pioneering funder of single-investigator grants for blue-skies science, the European Research Council (ERC). The ERC already treats its awardees as freelancers, in the sense that it encourages them to shop around for the most attractive venue in which to embed and implement their research project. The quest for the best host institution takes place not only at the preparatory step of an ERC application: it also happens after the grant is awarded, since the grant money is considered inherently portable and can even be moved later on from one institution to another. This encourages potential host universities to compete for providing the best research environment, in which many factors come into play, not just but not least, the quality of its research infrastructure. How well it supports, rather than burdens its staff with administrative tasks, the nature of its recruitment and personnel policies, how it handles relocation issues for incoming researchers and their families, what opportunities it provides for further training in relevant skills

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and career development: these are just some of the factors in play.

In recent years, universities have seen their primary role in this process as encouraging their own tenured or tenure-track staff to apply for ERC grants. But I foresee the emphasis shifting increasingly to investigators who seek out universities that can make the most appealing offer, whilst universities and government agencies standing behind them will shape their policies so as to remain competitive. Moreover, in such a landscape there is no reason why a scientist cannot operate research projects on multiple sites if this offers the most convenient arrangement. The tools for remote meetings and cloud computing to which we have all become accustomed mean that there is no longer any need for a research group to be located in one building or even in one country, to operate efficiently as a team.

At the same time, many of the tasks involved in running a research institute or department can be efficiently outsourced to the most competitive bidder—to be assessed on the basis of value-for-money, not just minimum cost. As a society, we should be asking ourselves why we continue to waste the talents of highly specialized scientists on performing admin tasks for which they are neither properly trained nor motivated, instead of just engaging a smart-software developer. Why should we fund creative thinkers to undertake laboratory projects in host institutions that do not have the required state-of-the-art facilities to perform them? Or allocate budgets that are so pared down that grantholders cannot even afford to purchase such services elsewhere? Why should we expect them to make do with poorly paid trainees instead of a team of professionals? And why should we continue to organize research in pyramid structures where everything depends on commands from the top, where all findings are announced using an institutional slide template, where colleagues elsewhere are considered as untrustworthy "competitors", and where credit for individual creativity is usurped by seniors who barely know the contents of the papers they "write"?

In the "old system", we have all gotten used to making do with sub-optimal working arrangements and grumbling about them, whilst considering them an immutable fact of life. But I envisage a time coming soon where we scientists will have the edge in reshaping the market for teaching and research in a way that is much more to our liking and properly aligned with our skills. At the same time, our individual success in accomplishing our professional goals will have a direct effect on our income and job satisfaction, and steer us towards activities where our talents are most effectively deployed. In short, I believe that we, as freelance scientists, will be much more firmly in control of science in the future and that time is not far off.