

Let's free up PhD potential

Not enough prospects in universities and industry means Japan isn't making the most of valuable researchers.

Japanese science has a problem: there are too many PhD holders and not enough senior roles in universities for them to move into. This is partly caused by a well-meaning, but flawed policy to promote Japanese research that dates back almost three decades.

In 1996, Japan began a plan to boost the number of its academic researchers with a PhD but who are not yet in permanent faculty positions. The country aimed to produce 10,000 of these postdoctoral roles and by 2006 it had exceeded this goal, creating more than 16,000 positions. This leaves a fairly obvious question; what happens to a researcher after they've completed a postdoc? There hasn't been a serious enough effort to create a career pathway for these researchers in academia. Employment in industry is also an uphill battle for them because – although progress has been made – Japanese businesses on the whole still don't fully appreciate PhDs as a qualification.

Many students here in Japan increasingly believe that finding jobs in industry, even in pharmaceutical firms and other research-related companies, is easier without a PhD. This is because there can be a belief in industry that it's better and easier for a company to train newly hired employees from scratch, rather than training someone who already has their 'own way of doing things'. In the United States, 40.2% of PhD holders are employed in private industry, but in Japan that figure is just 14%. Hopefully, the 14% in Japan will prove how PhD holders can contribute to businesses so that more companies employ doctoral graduates, something that could also lead to greater collaboration between academia and industry.

Earning a PhD demands an excess of patience, imagination, flexibility and expertise. Surely these are enviable characteristics for any candidate seeking promotion, be that in academia or private industry.

Ideally, similar to universities in the United States and some other countries, a successful postdoc would advance to become an assistant professor before finding a job as a full professor. Assistant professors in Japan, however, have considerably less freedom to pursue their research aims. In Japan an assistant professor is still a junior role, not dissimilar to the postdoc position, in which you mostly assist the more senior professor with their work. This makes it difficult to be productive in research and forge an independent path. Even if someone manages to accomplish this, there is a dearth of vacant faculty positions to move into. There are



Ayuko Hoshino calls for a new view to widen career pathways for PhD holders.

“Japanese businesses on the whole still don't fully appreciate PhDs.”

now so many postdocs aged 40 and above that they're now competing with their younger colleagues for increasingly narrow career pathways. In 2018, for instance, 28.2% of postdocs were in this age group compared with 16.4% in 2012.

Instead of benefiting from these educated and experienced PhD graduates, Japan is squandering them. This needs to change – not least because it is undermining efforts to improve the gender balance in science, technology, engineering and maths (STEM) subjects, something which is badly needed. Data from the Organisation for Economic Co-operation and Development in 2020 ranked Japan as the lowest among wealthy nations on multiple metrics relating to women in STEM. Just 21.5% of Japanese PhD graduates are women, for example.

Although the career opportunities are limited for all genders, it's perhaps not surprising that men make up more than 80% of faculty positions, because frankly women have more barriers than men to overcome. The workplace isn't always well suited for young mothers, for example. We need more childcare support and spaces for nursing mothers. We also need to provide a supportive environment for young parents, particularly mothers, to attend conferences.

There are, however, signs that important changes are on the horizon for female researchers in Japan. Some universities, such as the Tokyo Institute of Technology, are instigating quotas to boost the number of female students. Approximately 14% of student places at the institute are now exclusively available to female applicants. This is meaningful change and will help, but it's again addressing the issue at the beginning of the skills pipeline. The real problem is further down the line when students become postdoc researchers and are confronted with the lack of opportunity.

If we can improve the career pathway for all postdocs, Japanese science – and industry – will benefit by putting its STEM human resources to good use while also addressing the gender imbalance. A rising tide lifts all boats.

Ayuko Hoshino is an associate professor at the Tokyo Institute of Technology.
e-mail: ayukohoshino@bio.titech.ac.jp