

**Abstract**

More and more people are getting PhDs. This growth is being driven by government policy, changes in academic work, the demand for doctoral researchers, credentialism, and the import of international talent. There is no longer room in the traditional academic career for all PhD holders. Many become “permadoocs,” lingering in an academic precariat; others must transition to jobs outside academia. Doctoral education needs to change to better prepare PhD holders for diverse careers.

## What Is a PhD Useful for?

Cláudia S. Sarrico

**D**octoral level attainment has been growing fast in high-income economies and, more recently, in lower-income ones as well. In 2019, the average share of 25–64-year-olds with a PhD across the OECD was around 1 percent. If the trend continues, 2.3 percent of today’s young adults will enter a PhD program at some point in their life. Why is this expansion taking place, and what is a PhD useful for today?

### The Number of People with a PhD Has Been Growing Fast

Concerns about the number of PhD holders dates back to the beginning of the 1980s in the United States, but the preoccupation has not dampened growth. The continued expansion has raised the question of the return on investment in the doctorate for individuals and for society.

The expansion of the doctorate follows from the general expansion of higher education from an elite to a mass pursuit, discussed by Martin Trow in the 1970s, and the generalization of high-participation higher education systems across the globe.

The expansion of doctoral education, whose primary aim is to train people to conduct research, is a well-established phenomenon in OECD countries, where research activity was traditionally concentrated, but nowadays research capacity is spreading to more countries, with the notable rise of China.

The numbers are telling. According to the World Bank, in 2020, only 36 countries had a doctoral level attainment above 0.6 percent in their population, with only a few outside the OECD. In the OECD, the number of new doctorates awarded practically doubled in the two decades prior to 2017 (from 140,000 to 276,800). By comparison, gross domestic spending on R&D grew only by 18 percent during 2000–2020. This means that many doctorate holders will not be involved in research activities.

The growth in doctoral level attainment is much faster than general tertiary education attainment: Between 2014 and 2019, in the OECD, doctoral education grew by 25 percent (0.93 to 1.16 percent), while tertiary education grew by 12.7 percent (33.65 to 37.90 percent).

### Why Are So Many PhDs Being Awarded?

Governments have been encouraging the production of more PhDs in the hope of developing knowledge economies to spur growth and prosperity. Research funding rewards institutions directly for producing more PhDs, more postdoc positions, and indirectly for the publications and citations that they are instrumental in producing. Most of the additional research funds made available are for fixed-term projects employing postdoctoral researchers on fixed-term contracts. The expansion of doctoral education ensures a constant supply for these postdoctoral positions.

Increased availability of research funding has also generated demand for an academic career from university graduates, especially from those with a “taste for science.” In some fields, these PhD holders are also valued outside academia, by employers who appreciate their technical and transferable competences. This is more likely in science ecosystems, where there is cooperation between universities and the world outside, and where the technology intensity of businesses and the degree of development of the economy is high.

Some individuals may also be using the PhD to differentiate themselves in saturated markets for graduates in high-participation systems of higher education. This credentialism is more likely to take place in professional fields such as business, public administration, and health, and it is more about increasing someone’s status than a response to labor market needs. Arguably, some of these “professional doctorates” are not compliant with the traditional and accepted international definition of a PhD: the result of substantive original research work. In the United States, the National Science Foundation

in its Survey of Earned Doctorates uses a stricter definition of “research doctorate” than does the Integrated Postsecondary Education Data System, and few EdD (doctorate in education) and DBA (doctor of business administration) programs meet the standard.

Another extreme example of credentialism has been demonstrated by several public figures, often politicians, losing their PhDs because of plagiarism. It denotes that the pursuit of knowledge was not their goal. Instead, they used the PhD to boost their career and social status.

The import of talent is another major driver of PhD production. More than one in five PhD students in the OECD are international students (compared to only 4 percent at the bachelor level). In most countries, English has become the *lingua franca* at this level to attract the best foreign talent, including outside the English-speaking world. Many countries rely on these migrants to feed their research systems.

### What Happens to PhD Holders after Graduation?

Although many will try, most PhD holders will not be able to enter the traditional academic profession, becoming “permadoocs” for a long time, taking a succession of fixed-term contracts before transitioning to a job outside academia, some in research, most in nonresearch activities.

Insecurity has always characterized the early stages of an academic career, but with the rise in numbers of PhD holders, younger cohorts are faring less well in transitioning to an indefinite contract within academia. Those that do need to be geographically mobile and self-confident, devote a lot of energy to research and networking, and be prepared to endure a long period of precarity.

Precarity raises serious issues of equity, diversity, and inclusion, as those from privileged backgrounds are more likely to be undeterred by it. As for women, they are now on par in most fields in doctoral education. But they are still underrepresented in tenure-track positions, in the higher echelons of the academic career, and in fields that offer better opportunities outside academia, such as engineering. The international mobility required of an academic career is another deterrent that women face, especially those with children.

The danger for academia is that it can no longer attract and retain the most talented, as jobs beyond academia offer indefinite contracts earlier, as well as better earnings and better prospects for career progression. And although the intellectual rewards are perceived to be better in academia, PhD holders in other jobs tend to be satisfied with their situation. Academia must offer better working conditions, otherwise the quality of science is likely to suffer. There is already anecdotal evidence that, in some fields, postdoc positions are becoming harder to fill.

Moreover, if PhDs continue to be produced at a rate that the academic career cannot absorb, then doctoral education ought to better prepare candidates for diverse career options in higher education, business, government, the private nonprofit sector, and self-employment.

### What Does This Mean for Doctoral Education?

The growth of doctoral education has resulted in more formal, structured, and regulated programs of study. It has also brought more diverse approaches, balancing the tension between the traditional disciplinary research doctorate with the need to prepare PhD candidates for productive jobs beyond academia.

Concern about the value of the doctorate beyond academia has become common in all disciplines. New collaborative PhD programs in cowork environments have emerged with public and private institutions. They are meant to have the same status as the traditional PhD, are still considered “research doctorates,” but pursue applied rather than theoretical knowledge. They place new demands on both parties, with different cultures and different priorities. They also raise questions of academic integrity and freedom in collaborative arrangements, which need to be dealt with.

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Cláudia S. Sarrico is professor of management, School of Economics and Management, University of Minho and CIPES (Centre for Research in Higher Education Policies), Portugal.  
Email: [c.s.sarrico@eeg.uminho.pt](mailto:c.s.sarrico@eeg.uminho.pt).

Doctoral candidates have also become more diverse: Some do not come straight from previous studies, are older, and have professional experience. This means that a single model of doctoral education is no longer fit for purpose and a diversity of offers is necessary.

Doctoral education needs to prepare graduates for jobs outside academia, but also for broader academic career requirements, such as research, education, societal engagement, and leadership and management tasks, i.e., diverse careers within and beyond academia. ▲