

Towards Describing the **Global Doctoral Landscape**

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Introduction

The doctorate is the highest degree awarded by higher education institutions, and it is earned by those who have made an original contribution to knowledge, practice and understanding in one or more disciplines and/or in their professions. As such, doctoral graduates are in demand internationally because they have important roles to play as researchers in the knowledge economies both within academia and, increasingly, in the private, public, and not-for profit sectors.

However, relatively little is known about the global landscape of doctoral education. How many higher education institutions award doctorates? How many candidates are studying for them? How many doctoral graduates are being produced? And how do the answers to all of these questions vary between regions and countries? The answers to these questions are of interest in themselves, but also in the context of providing a framework for the comparative study of doctoral education, e.g. for sampling purposes.

The aim of the present paper is to see how far existing published source materials can shed light upon this landscape. The objectives are to look at the available evidence relating to the numbers of institutions offering doctorates, the numbers of students enrolled, and the numbers of doctoral graduates and to look at their distributions between regions and countries. The paper is organised in accordance with these three themes.

Institutions Offering Doctoral Programmes

The largest and most comprehensive database of higher education institutions is UniRank (2020). The criteria for inclusion in the database are that institutions must be officially licensed or accredited by national or regional authorities to award undergraduate and/or postgraduate degrees delivered in a face-to-face format through on-site facilities. While this excludes purely on-line providers, the most recent (July 2020) database covered over 13,000 institutions in 198 countries. Institutions are invited to supply a range of information about their undergraduate and postgraduate programmes, including doctoral ones.

In principle, then, it is possible to look at each institution in each country and see if they offer a doctoral programme or programmes. In practice, this is not always possible because not all institutions engage with the UniRank database, and there can be significant numbers of missing data, particularly in a number of the developing countries of Africa and some parts of Asia. So it is possible that, as well as the institutions declaring doctoral provision, there are some which do not declare it. That point made, it is significant that institutional reporting seems much more prevalent among highly ranked institutions than lower ranked ones, and it is likely that the former which are generally more likely to offer doctoral programmes.

But, if the count is inexact, it is still of interest to see how many institutions offer doctoral programmes. A trawl of, in all, 13,748 institutions in the database revealed 5,316 offering such programmes, 39% of the total.

These 5,316 institutions were then grouped according to regions. The UniRank dataset uses a United National classification into the six regions of Africa, Asia, Europe, Latin America, North America, and Oceania. This results in some counter-intuitive allocations, for example Georgia, Israel and Jordan being placed in Asia, and it was felt preferable to adapt a more fine-grained classification. Instead, the allocation was on the basis of the regions identified by Rosenberg (2017) of 1) Asia 2) Central and South America 3) Eastern Europe and Russia 4) The Middle East. Arabia and North Africa 5) North America 6) Oceania 7) Sub-Saharan Africa and 8) Western Europe.

Table 1. Regional distribution of institutions reporting doctoral programmes

	Number reporting	%
Asia	1524	28.7
North America	1140	21.4
Western Europe	1496	14.3
Eastern Europe and Russia	744	14.0
Central and South America	359	6.8
Middle East, Arabia and North Africa	501	9.4
Sub-Saharan Africa	223	4.2
Oceania	63	1.2
Totals	5316	100.0

It is clear from this that the dominant regions in terms of numbers of institutions offering doctoral programmes were Asia and North America, which collectively accounted for 50% of the total, followed by Eastern Europe and Russia and Western Europe, which accounted for a further 28%, i.e. over three-quarters of the programmes were provided in these regions and only a quarter in the rest of the globe.

As well as regional comparisons, it is possible to make country comparisons. In the UniRank data, institutions in 20 countries reported no (or failed to report any) doctoral programmes. Of these, 1 the majority (12) were in Sub-Saharan Africa and only eight from the rest of the world.

The numbers of institutions in the top 30 of the 178 countries which did report doctoral provision are set out below with a summary figure for the remainder.

Table 2. Country distribution of institutions reporting doctoral programmes

	Number reporting	%
United States	987	18.57
India	309	5.81
Japan	276	5.19
Russian Federation	211	3.97
China	192	3.61
Turkey	168	3.16
United Kingdom	146	2.74
Germany	140	2.63
Philippines	132	2.48
France	105	1.98
Iran, Islamic Rep.	102	1.92
Mexico	100	1.88
Brazil	95	1.78
Ukraine	95	1.78
Pakistan	83	1.56
Indonesia	82	1.54
Korea, Rep.	80	1.50
Italy	77	1.45
Poland	74	1.39
Taiwan	68	1.28
Romania	65	1.22
Spain	63	1.19
Argentina	59	1.10
Canada	53	1.00
Kazakhstan	46	0.87
Bangladesh	45	0.85
Nigeria	45	0.85
Thailand	43	0.80

Algeria	40	0.75
Australia	39	0.73
Sub-totals (N=30)	4020	75.58
Other (N=148)	1296	24.22
Totals (N=178)	5316	100.00

What is striking is the predominance of the United States, which had just under one in five of all of the institutions declaring doctoral programmes across the globe. In all, the top 30 countries accounted for three-quarters of institutions declaring doctoral programmes, with the remaining 148 accounting for only 25%.

Enrolments in Doctoral Programmes

The next question concerns the numbers of candidates enrolled on doctoral programmes. Here, there were two main sources of data, the enrolment statistics published by the World Bank (2019) and those published by UNESCO (2017) with both based upon statistics supplied by governments.

Of the 198 countries covered by these two sources, there was no data on doctoral enrolments for 72 countries. These included those with no doctoral provision and those for which there were no national statistics. In the latter case this was mainly because the countries were small islands and part of federal universities which did not publish separate statistics for each constituent country (as in the Universities of the West Indies and the South Pacific). In these cases, the numbers were probably very small, but there were several other countries, including Algeria, Nigeria and Taiwan, with substantial numbers of institutions offering doctoral programmes where data was missing and where it seems likely that much larger numbers of candidates were enrolled. So the present analysis is incomplete and an underestimate of global numbers.

But it is still an impressive total in the 126 countries where data is available. In 2017 – the latest series available – there were 2,882,975 candidates enrolled for doctoral degrees. As would be expected on the basis of the institutional provision of doctoral programmes, there was a high degree of regional concentration.

Table 3. Regional distribution of doctoral enrolments 2017

	Number of candidates	%
Asia	837056	29.0
Western Europe	672953	23.4
North America	443441	15.4
Middle East, Arabia and North Africa	352942	12.2
Eastern Europe and Russia	276777	9.6
Central and South America	165105	5.7
Sub-Saharan Africa	69294	2.4
Oceania	65047	2.3
Totals	2,882,975	100.0

The largest numbers of candidates were in Asia and Western Europe, which collectively accounted for 52% of the total, with North America and the Middle East, Arabia and North Africa accounting for a further 27% between them; overall these regions accounted for over three-quarters of the total.

In terms of country patterns, the numbers of enrolments are set out below for the top 30 countries in the world with a summary for the remainder.

Table 4. Country distribution of doctoral enrolments 2017

	Number of candidates	%
China	357091	12.39
United States	351076	12.18
Germany	198300	6.88
India	144575	5.00
Iran, Islamic Rep.	140558	4.87
United Kingdom	112289	3.89
Brazil	112123	3.89
Russian Federation	99273	3.45
Turkey	91267	3.16
Japan	80910	2.81
Korea, Rep.	74342	2.58
Spain	71548	2.48
France	66855	2.32
Australia	55669	1.93
Canada	52917	1.83
Egypt, Arab Rep.	45032	1.56
Poland	43181	1.50
Malaysia	41717	1.45
Mexico	39448	1.37
Indonesia	36148	1.25
Morocco	30172	1.00
Greece	28682	1.00

Ukraine	28387	1.00
Italy	27729	1.00
Argentina	26098	0.91
Switzerland	24825	0.86
Philippines	23827	0.82
Czech Republic	23538	0.82
Austria	22868	0.79
South Africa	22636	0.79
Sub-total (N=30)	2473081	85.78
Other(N=96)	409894	14.22
Total (N=126)	2882975	100.00

The largest number of enrolments was in China, closely followed by the United States, and these two countries accounted for nearly one-quarter of all doctoral enrolments. In this case, the top 30 countries were responsible for 85.78% of enrolments, with the remaining 96 responsible collectively for just under 15%.

Doctoral graduates

For doctoral graduates, the main source of data was the UNESCO (2019) dataset. The latest data available from this source was for 2016, and it covered 93 countries, i.e. data was not available for anything like a full set of cases. But, even for this reduced set, the total of doctoral graduates in that year was still impressive at 438,911.

Table 5. Regional distribution of doctoral graduates 2016

	Number of graduates	%
Asia	113342	25.8
Western Europe	110682	25.2
North America	86560	19.7
Eastern Europe and Russia	57659	13.1
Middle East, Arabia and North Africa	27982	6.4
Central and South America	27802	6.3
Oceania	10384	2.4
Sub-Saharan Africa	4500	1.0
Totals	438,911	99.9

Just over half of the doctoral graduations were in Asia and Western Europe, with a further 20% in North America while the rest of the world accounted for only 30%.

In terms of the country distribution, the numbers of graduates in the top 20 are set out individually below, with a summary figure for the remainder.

Table 6. Country distribution of doctoral graduates 2016

	Number	%
United States	69525	15.84
China	55151	12.57
Russian Federation	27212	6.20
United Kingdom	26400	6.01
India	25095	5.72
Brazil	20605	4.69
Germany	20303	4.63
Japan	15804	3.60
Spain	14694	3.35
Korea, Rep.	13882	3.16
France	13016	2.97
Italy	9803	2.23
Mexico	9268	2.11
Australia	9089	2.07
Ukraine	8208	1.87
Canada	7767	1.77
Egypt, Arab Rep.	7702	1.75
Iran, Islamic Rep.	7531	1.72
Turkey	6052	1.38
Netherlands	4967	1.13
Sub-totals (N=20)	372074	84.77
Other (N=73)	66837	15.22
Totals(N=93)	438,911	99.99

The US led in numbers of doctoral graduates, with China in second place. In all, the top 20 of the 93 nations accounted for just under 85% of all doctoral graduations and the remaining 73 for a mere 15%.

Conclusions

While there are issues of missing data for all of the sources used in the above analysis, the available information does indicate the massive scale of doctoral education across the globe. It shows that there were at least 5,316 institutions providing doctoral programmes, that in 2017 there were at least 2,882,975 candidates enrolled on these programmes, and that in 2016 at least 438,911 candidates graduated with doctorates.

It also shows the very heavy concentration of doctoral education in the three regions of Asia, North America, and Western Europe, which accounted for the vast majority of programmes, candidates and graduates.

In terms of countries, the data show the dominance of China and the United States in doctoral education with these two countries alone counting for a quarter of doctoral enrolments and a quarter of doctoral graduates.

The corollary of these points is that there are vast swathes of the globe, particularly in Central and South America (except for Brazil) and Sub-Saharan Africa (except for South Africa) where doctoral education is very limited in terms of institutional provision, enrolment, and doctoral graduates. But it is, of course, precisely these regions and countries which have the greatest need for researchers to enable them to flourish and develop their knowledge economies and promote economic growth.

As well as illustrating the huge imbalances in doctoral education across the globe, these data have at least two other uses.

Firstly, they can be useful in planning international studies of doctoral education. So for example, recently the author co-edited (with Margaret Kiley and Karri A. Holley) (2021) a book on 'The Making of Doctoral Supervisors' which was based on case studies. The UNESCO and World Bank data were used to select appropriate examples, including those of Iran and Turkey which are clearly emerging major players in doctoral education.

Secondly, the data can be used to track changes over time. It is evident from these data that Asia is now the leading region in doctoral education with the largest numbers of enrolments and doctoral graduates, while at country level the traditional dominance of the United States is under threat by China. It would not be surprising if, when more recent data becomes available, the latter has overtaken the United States as the world's largest producer and is now the powerhouse of doctoral education globally.

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