Country Report – Brazil

STINT
The Swedish Foundation for International
Cooperation in Research and Higher Education

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Background

Recognising the importance of intelligence and analyses for the development of international strategies for higher education and research on various levels within the knowledge system, STINT has compiled a series of brief country reports with a focus on the academic profile and performance.

Released as a pilot series of three countries – Brazil, Japan, and South Africa – these country reports aim to provide national overview using current and reliable data. They give insight into each country's higher education system as well as its respective demographic and economic context.

The intention is that both policy-/decisionmakers and practitioners within the Swedish higher education system will utilise these reports in furthering international strategic collaboration on various levels.

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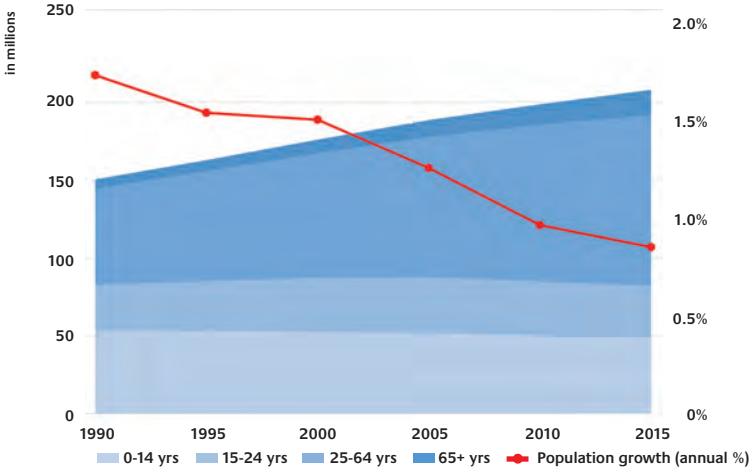
Country data

Like many of its South American neighbours, Brazil has witnessed a rapid fertility decline since the 1960s. Though Brazil has seen a rapid economic transition, the effects of urbanisation and economic modernisation has also lent itself to falling birth rates. Between 1950 and 2000 the population grew from 52 million to 170 million and in the same time fertility rates dropped from 6.2 to 2.2.[1]

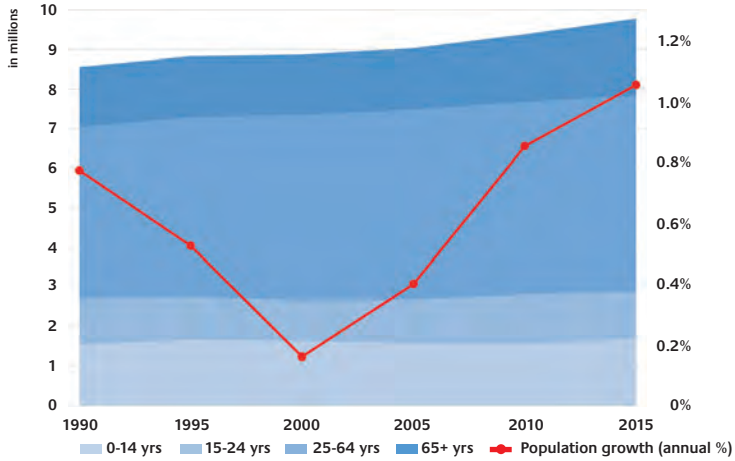
Figure 1. **Brazil – Demography & population**[1]



[1] **Demographics:** United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, DVD Edition, accessed on 21/4/2016
Population growth rate: Latest available data, World DataBank: World Development Indicators, accessed on 30/9/2015
Ana Maria Goldani (2002) United Nations, Department of Economic and Social Affairs, Population Division, p. 358

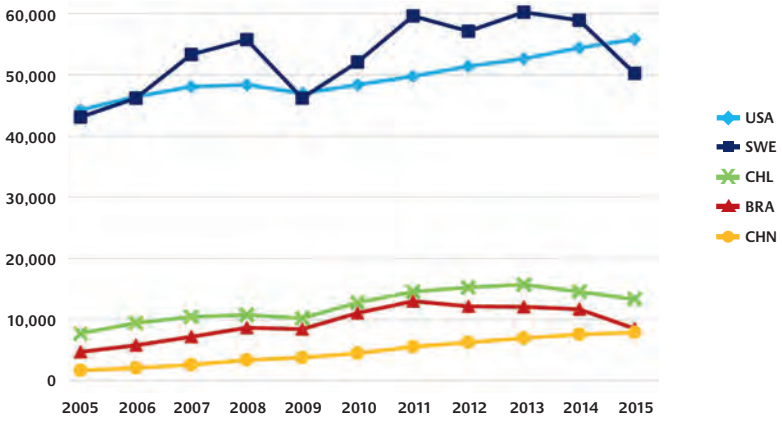
In several ways the scenario in Europe is the opposite end, it is estimated that South America has on average 35 people over the age of 65 for every 100 people under 15 years, a figure which is 170 in Europe.[2] Naturally the demographic transition in Sweden and Europe is at a more advanced stage and as such face a different set of challenges. With greater life expectancy and a decreasing birth rate, the older demographic groups in Sweden are increasing in both numbers and percentage.

Figure 2. **Sweden – Demography & population**[1]



Recent reports from the IMF have indicated that the Brazilian economy in the latter half of 2016 is showing early signs of recovery. Albeit the economy is still contracting and the country reeling from its deepest recession in decades. The Brazilian economy has been shrinking since 2014 and reached its nadir in 2015 when its GDP contracted by 3.8%. Although the second quarter of 2016 showed some signs of a recovery, the GDP is projected to have contracted by 3.4% only to shift in 2017.[3]

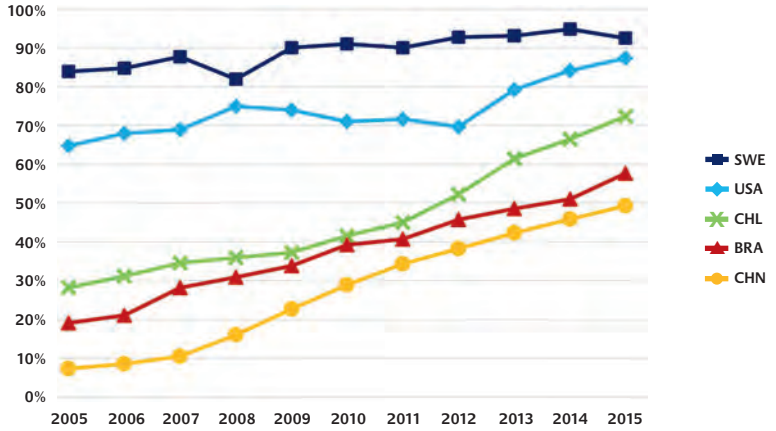
Figure 3. **GDP per capita (current USD)**[4]



[2] Stratfor (2012) 'Demographic Trends in South America' accessed on 10/11/2016
[3] OECD (2016) Economic Outlook Brazil, Volume 2016, Issue 2, preliminary version
[4] World DataBank: World Development Indicators, accessed on 22/12/2015

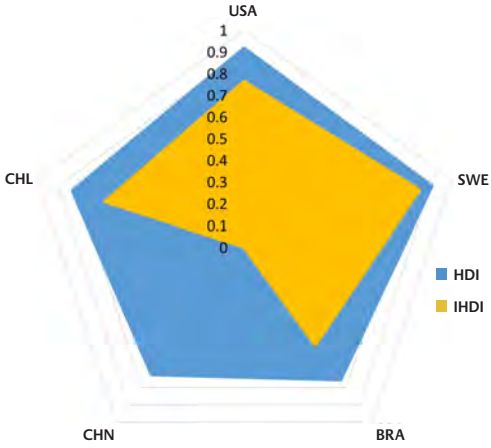
With the world's sixth largest population Brazil is, unsurprisingly, one of the largest internet and mobile phone users in the world (8th for fixed-broadband, 6th for mobile-cellular).[5] Though whilst looking at the ratio against the overall population in Figure 4 we see more clearly the uneven distribution of this usage.

Figure 4. **Share of internet users**[6]



UNDP estimates that between 1980-2014 Brazil's Human Development Index (HDI) rose by 38.1%, putting it today in the second highest category of human development.[7] Though the great economic strides over the last three decades brought about this meteoric rise it has been a divided growth – of rich-poor, urban-rural and north-south. Thus, a different image emerge when the country's HDI is adjusted for inequalities, causing the index to fall by 26.3%, well above the average loss for both its development category (19.4%) and its region (23.7%). As an opposing example we can see that the high level of human development in Sweden in fact sees a significantly smaller drop of 6.7% when accounting for inequalities. And that the country in fact climbs in international rankings after the adjustment.

Figure 5. **UNDP indices 2014**[8]

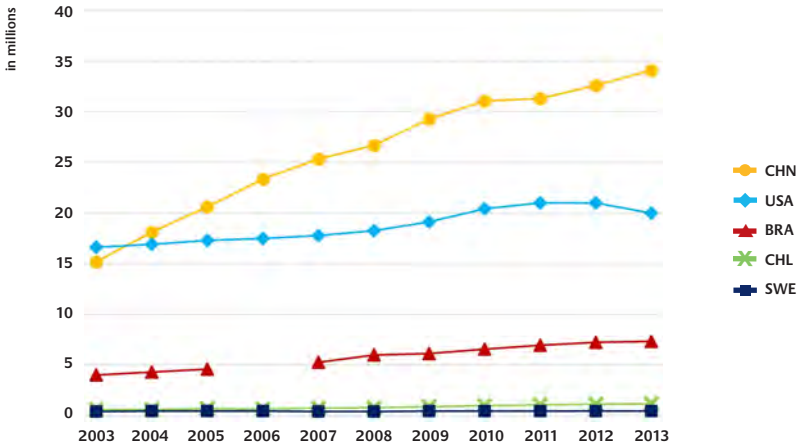


[5] ITU: Facts and Figures, accessed on 5/12/2016
[6] World DataBank op cit
[7] UNDP (2015) Human Development Report: Country Briefing Note Brazil, accessed on 9/12/2016
[8] UNDP: Human Development Reports, accessed on 13/1/2016, no data point for Chinese IHDI value available.

Academic profile: National level

Although Brazil's welfare programmes have made great progress in primary education, the tertiary attainment rates remain very low. With a tertiary attainment rate of only 12% Brazil falls not only well below the OECD average of 32% but amongst the lowest in the world.[9]

Figure 6. **Gross enrolment, tertiary, both sexes (total number)**[10]



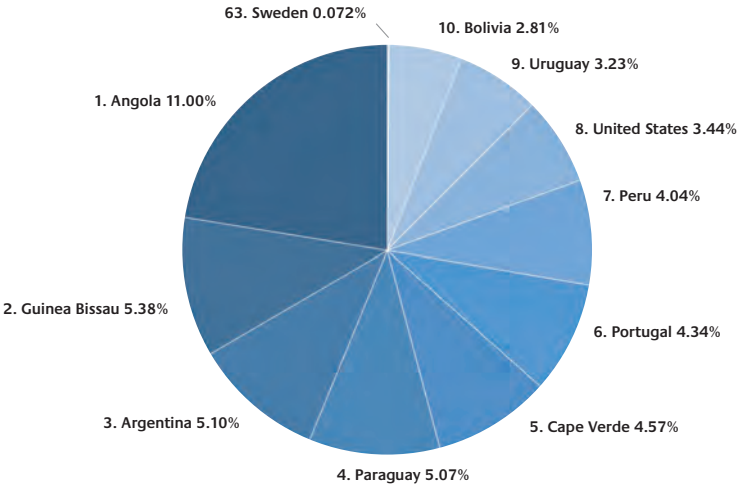
Despite hosting five of Latin America's top ten universities according to Times Higher Education we see in Figure 7 that Brazil's incoming student mobility remains poor. The OECD in fact reports that Brazil has the lowest degree of foreign student enrolment of all membership countries, less than 0.5% of all tertiary enrolments.[11] The focus is mainly on students from the Portuguese-speaking world and with the bulk of students originating from Angola.

Whilst looking at the outgoing mobility flows in Figure 8 we see an entirely different image. Much due to scientific mobility programmes such as Science Without Borders, 'Ciência sem fronteiras', which sent out almost 93,000 students and researchers between 2011-2016,[12] the outward student mobility flow from Brazil is significantly larger. Although the vast majority of students travel to USA the overall dispersion remains geographically varied.

[9] OECD (2013) Education at a Glance: Country Note Brazil, accessed on 10/12/2016
[10] United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics, accessed on 25/04/2016
[11] OECD (2014) Education at a Glance: Country Note Brazil, accessed on 11/12/2016.
[12] CAPES (2016) Noticias: 'Capes divulga números referentes ao Ciência sem Fronteiras', published 6/6/2016, accessed on 10/12/2016

Percentage of total mobile student population – IN

Figure 7. **Brazil – Tertiary-level student inflow – 2012**[13]

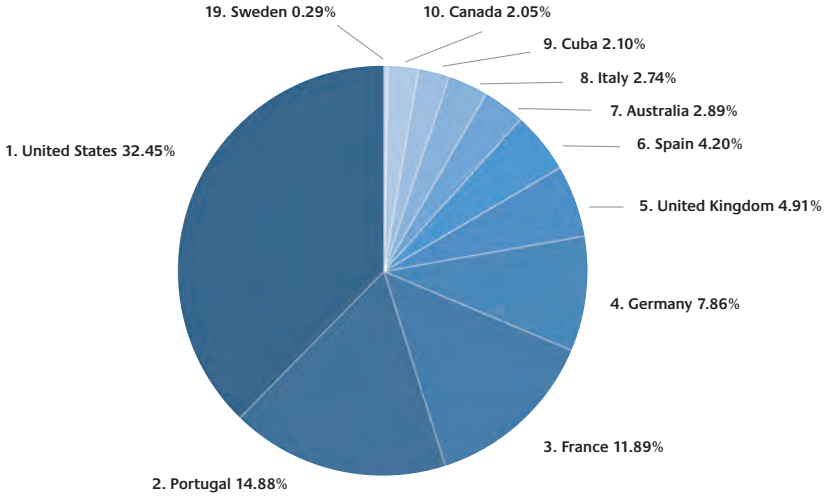


Rank	Country of origin	Mobility volume	% of total student population
1	Angola	1,675	0.023%
2	Guinea-Bissau	819	0.011%
3	Argentina	776	0.011%
4	Paraguay	772	0.011%
5	Cape Verde	696	0.010%
6	Portugal	661	0.0091%
7	Peru	615	0.0085%
8	United States	523	0.0072%
9	Uruguay	491	0.0068%
10	Bolivia	427	0.0059%
63	Sweden	11	0.00015%
	Total student pop:	**7,241,405**	**100%**

[13] United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics, accessed on 22/12/2015

Percentage of total mobile student population – OUT

Figure 8. **Brazil – Tertiary-level student outflow–2012**[13]

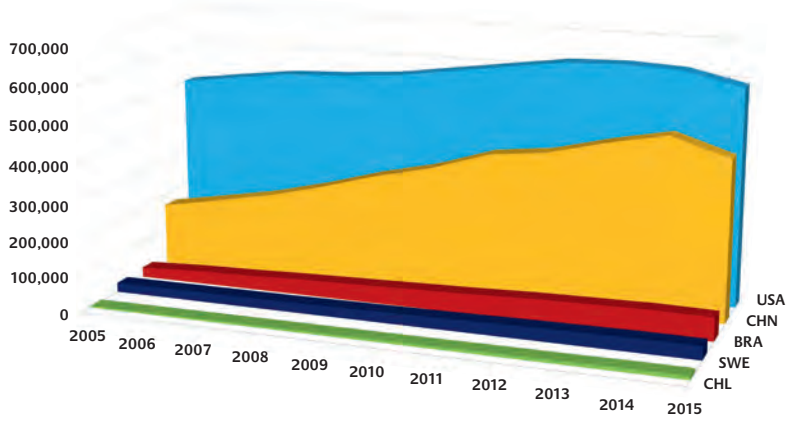


Rank	Destination country	Mobility volume	% of total student population
1	United States	10,401	0.14%
2	Portugal	4,769	0.066%
3	France	3,810	0.053%
4	Germany	2,520	0.035%
5	United Kingdom	1,573	0.022%
6	Spain	1,346	0.019%
7	Australia	925	0.013%
8	Italy	877	0.012%
9	Cuba	674	0.0093%
10	Canada	657	0.0091%
19	Sweden	94	0.0013%
	Total student pop:	**7,241,405**	**100%**

[13] United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics, accessed on 22/12/2015

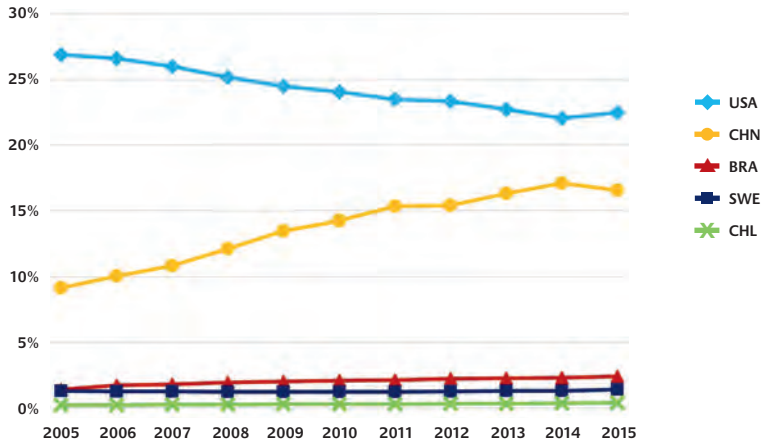
With a total publication volume of 552,487 between 2005-2015 Brazil places itself, in terms of output, on par with Russia and just below Australia, South Korea and Spain.

Figure 9. **Annual volume of scholarly publications**[14]



Brazil is responsible for 2.43% of the global publication output, or about a tenth of American publications, and has experienced a 240% growth over a ten-year period. It also has a strong regional presence with at least three times larger output than any other country in Latin America.

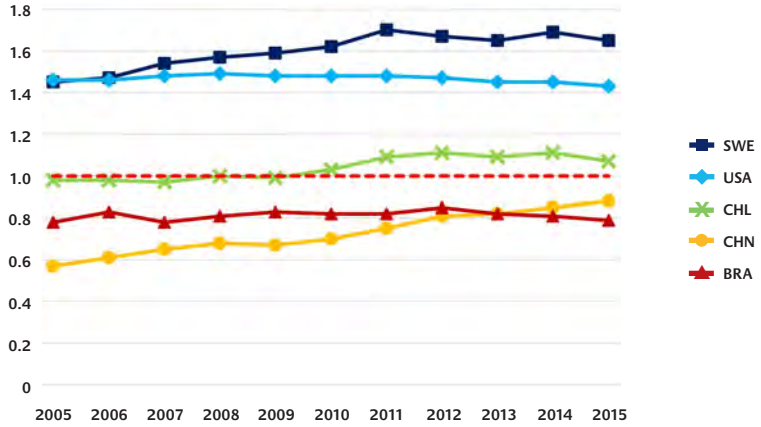
Figure 10. **Global share of scholarly publications (%)**



[14] All the data included below has been collected from SciVal® database, Elsevier B.V., http://www.scival.com, accessed on 18/1/2016

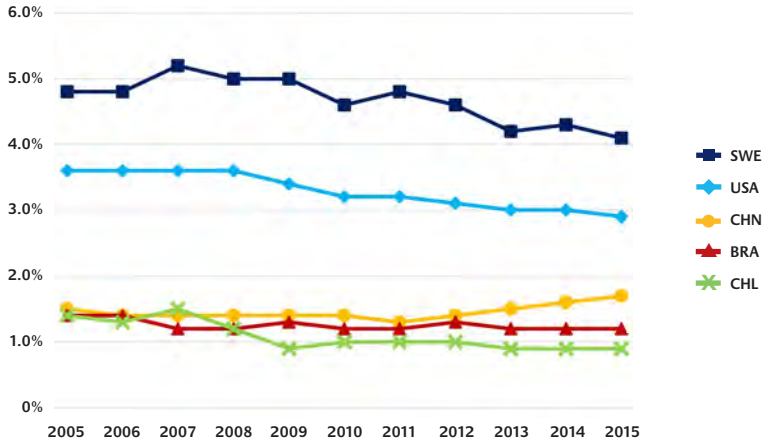
Albeit when looking at the quality of these publications through using an index measuring the field-weighted citation impact (FWCI) we can see that there has been no corresponding rise in the quality of these publications. Instead the index has remained stagnant and below the world average.

Figure 11. **Quality of scholarly publications, FWCI**[15]



Likewise we see a similar trend when looking at the share of corporate affiliations for these publications. Although a particular strong suit of northern European countries, academic-corporate collaboration in Brazil remains low, below world average and with little development over the last decade.

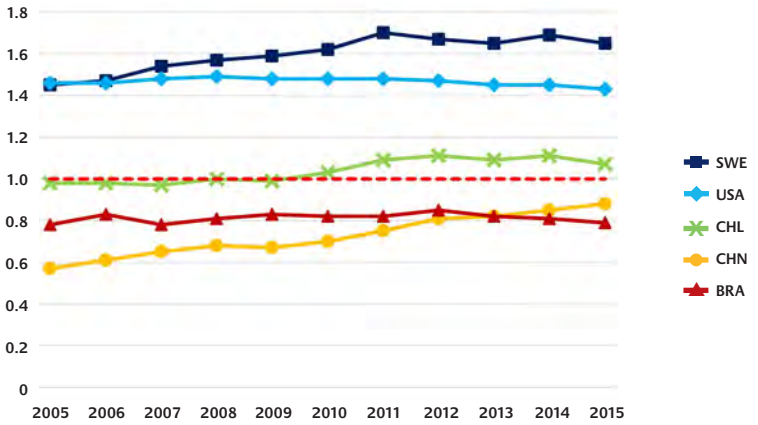
Figure 12. **Academic-Corporate Collaboration, publications with both academic and corporate affiliations (%)**



[15] Field-Weighted Citation Impact (FWCI) is the ratio of citations received and citations expected from the average in its field of study.

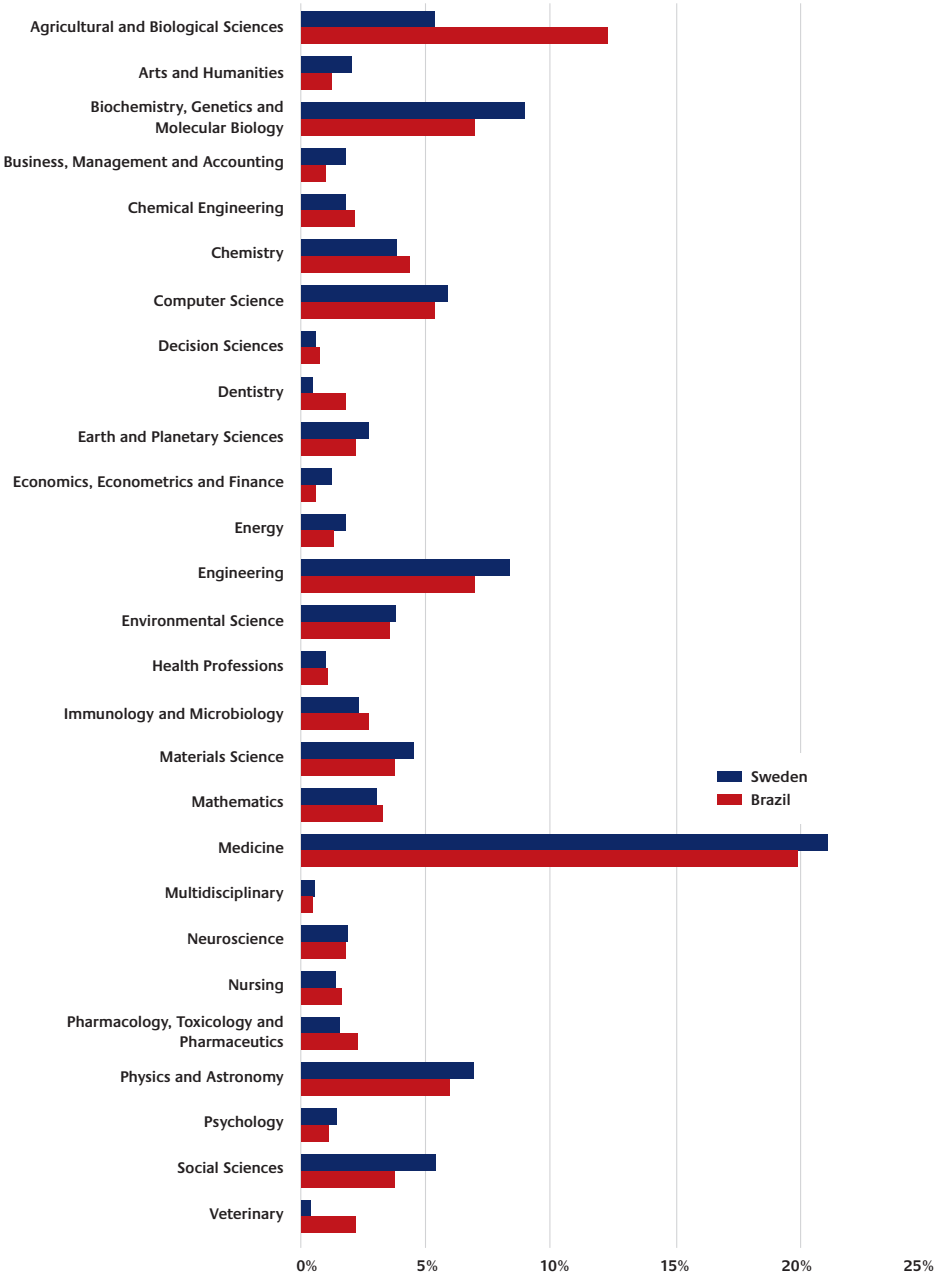
Also in terms of the degree of international collaboration, does Brazil place itself in the lower strata of the reference countries. Nor do we here see any significant signs of improvement over a ten year period and much akin to its limited incoming student mobility shows clear room for improvement.

Figure 13. **International collaboration, in Field-weighted internationalisation score (FWIS)**



Although there are significant differences between Sweden and Brazil in terms of publication output and quality, we can see a similar profile whilst looking at the corresponding fields of study for these publications in Figure 14. Similar to Sweden Brazil has a strong presence in medicine, engineering as well as physics and astronomy. Though differing with a significantly larger proportion of publications in agricultural, biological and veterinary sciences. Whereas biochemistry, social sciences and economics appear to have a relatively stronger presence in Sweden.

Figure 14. **Publications by journal category – 2011-15 (%)**

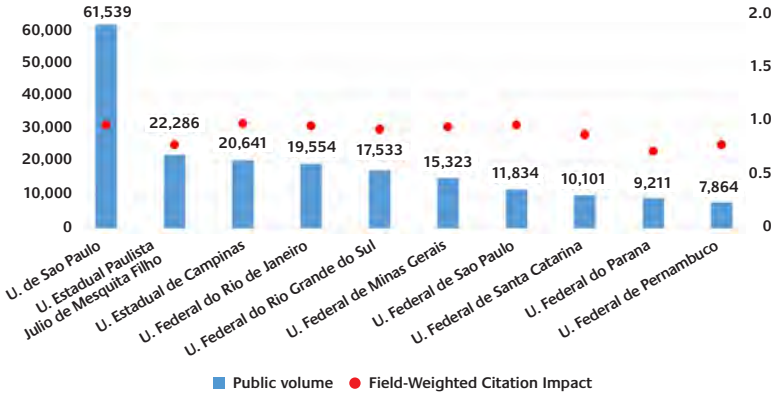


Academic profile: Institutional level

The Brazilian system of higher education is both large and decentralised, its Ministry of Education recognised over 2,300 higher education institutions. Amongst the 195 recognises as universities we can see the towering presence of the University of São Paulo, solely responsible for almost 20% of the country's publications.

With the remaining nine universities we find a fairly even distribution in terms of publication output although geographically we can see that these universities are almost exclusively located in the more prosperous southern regions.

Figure 15. **Brazil – Ten most published institutions, by volume and quality (FWCI) 2011-15**

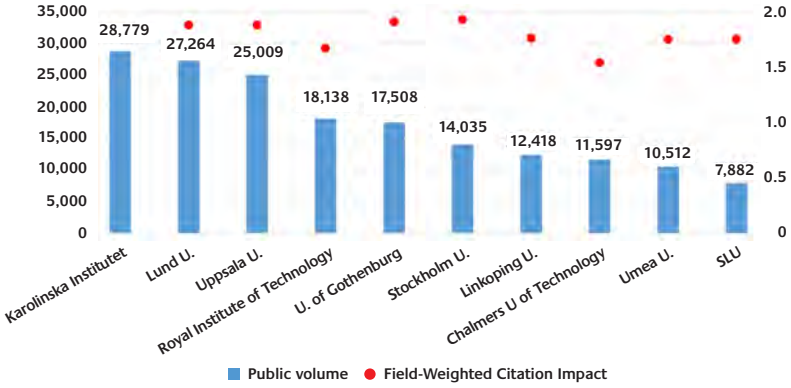


Institution	Number of publications	% of all BRA publications	FWCI	FWIS
U. de Sao Paulo	61,539	19.98%	0.96	0.79
U. Estadual Paulista Julio de Mesquita Filho	22,286	7.23%	0.78	0.56
U. Estadual de Campinas	20,641	6.70%	0.95	0.69
U. Federal do Rio de Janeiro	19,554	6.35%	0.95	0.82
U. Federal do Rio Grande do Sul	17,533	5.69%	0.91	0.72
U. Federal de Minas Gerais	15,323	4.97%	0.98	0.73
U. Federal de Sao Paulo	11,834	3.84%	0.99	0.65
U. Federal de Santa Catarina	10,101	3.28%	0.85	0.78
U. Federal do Parana	9,211	2.99%	0.74	0.62
U. Federal de Pernambuco	7,864	2.55%	0.81	0.68
Brazil	308,036	100%	0.81	0.73

Though Brazil's large higher education system caters to a vastly larger student body and produces almost twice as many publications we can, when comparing the same cross-sectional perspective in the Swedish case, see a more even distribution amongst the top ten institutions.

Furthermore we also see significant improvements when looking at the academic quality and international collaborative aspects of these publications. Both the FWCI and FWIS indices are at least twice as high for the Swedish institutions.

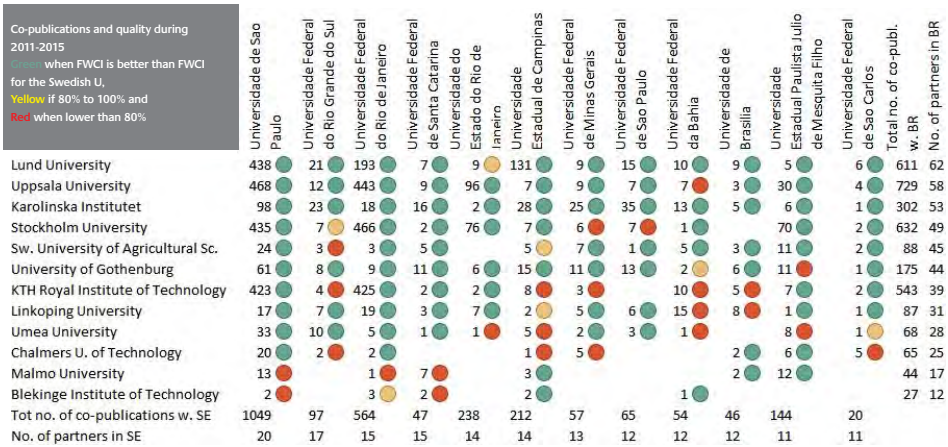
Figure 16. **Sweden – Ten most published institutions, by volume and quality (FWCI) 2011-15**



Institution	Number of publications	% of all SWE publications	FWCI	FWIS
Karolinska Institutet	28,495	15.87%	2.09	1.61
Lund University	26,541	14.79%	1.85	1.51
Uppsala University	24,541	13.67%	1.85	1.49
KTH Royal Institute of Technology	17,711	9.87%	1.66	1.59
University of Gothenburg	17,231	9.60%	1.89	1.42
Stockholm University	13,775	7.67%	1.88	1.43
Linköping University	12,218	6.81%	1.76	1.33
Chalmers University of Technology	11,310	6.30%	1.52	1.40
Umeå University	10,353	5.77%	1.75	1.42
Swedish University of Agricultural Sciences	7,853	4.37%	1.72	1.45
Sweden	176,494	100%	1.68	1.54

When looking at the co-publication patterns between Brazil and Sweden, there are already several existing collaborations in research. Between 2011 and 2015 2 661 publications were co-authored between 45 collaborating institutions in Sweden and Brazil. In Figure 17, the broadest collaborations in terms of the number of partners in each country respectively, are described. The University of São Paulo has co-publications with 20 Swedish institutions and from a Swedish perspective Lund University had the broadest collaboration with 62 Brazilian institutions. The dominance of green coloured spheres indicates that the quality of the co-publications is better than the average publications from a Swedish perspective.

Figure 17. **Sweden-Brazil co-publication matrix**



The Swedish Foundation for International Cooperation in Research and Higher Education, STINT, was set up by the Swedish Government in 1994 with the mission to internationalise Swedish higher education and research.

STINT promotes knowledge and competence development within internationalisation and invests in internationalisation projects proposed by researchers, educators and leaderships at Swedish universities.

STINT promotes internationalisation as an instrument to:

- Enhance the quality of research and higher education
- Increase the competitiveness of universities
- Strengthen the attractiveness of Swedish universities

STINT's mission is to encourage renewal within internationalisation through new collaboration forms and new partners. For example, STINT invests in young researchers' and teachers' international collaborations. Moreover, STINT's ambition is to be a pioneer in establishing strategic cooperation with emerging countries in research and higher education.

STINT
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