Country Report – Indonesia

STINT
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Foreword

Recognising the importance of intelligence and analyses for the development of international strategies for higher education and research at various levels of the knowledge system, STINT has compiled a series of brief country reports focused on their academic profiles and performance.

Released as a pilot series covering 16 countries, these country reports aim to provide national overviews using current and reliable data. The selection of countries is based on STINT's existing collaborations and other criteria, not least that the selected portfolio provides an interesting illustration of developments in the academic world:

- Brazil
- Canada
- Chile
- China
- India
- Indonesia
- Japan
- Malaysia
- Kenya, Rwanda, Tanzania and Uganda
- South Africa
- South Korea
- United States of America
- Vietnam

The reports provide insight into each country's knowledge system as well as its demographic and economic context. Primarily, our intention is that both policy and decision makers, as well as practitioners within the Swedish higher education system, will utilise these reports in furthering international strategic collaboration at various levels.

Special effort has been made to include the latest available data. Data were collected in July 2020; for further details about the data and methods, see the Appendix. Several persons at STINT have been involved in the production of these reports: Erik Forsberg, Andreas Göthenberg, Niklas Kviselius, Tommy Shih and Hans Pohl, who was the project leader and developed the tables and figures.

Introduction

Indonesia is the fourth most populous country in the world. It is also the largest archipelago on the globe. Its territory spans more than 17,000 islands along the equator between the Pacific and Indian Oceans. The majority of the population live on the island Java, which is also where the capital Jakarta is situated.

Indonesia, formerly a Dutch colony, became an independent country in 1949. Since 1998, it has been a democracy, and it was ranked 64th in the Economist Intelligence Unit's Democracy Index for 2020.

About 87% of Indonesia's population is Sunni Muslims, making Indonesia the largest majority Muslim country in the world. Indonesia's cultural and regional diversity is very rich.

Indonesia is viewed as having a promising economic future. The country is currently transitioning from an agricultural economy driven by commodity exports to an economy based on industrial manufacturing and services. This economic rise is partially based on demographic trends that will increase the country's population. It is estimated that 70% of the population will be working-age adults by 2030. However, Indonesia is characterised not only by deep regional disparities, but also by its status as a developing country that remains marred by various socioeconomic problems.

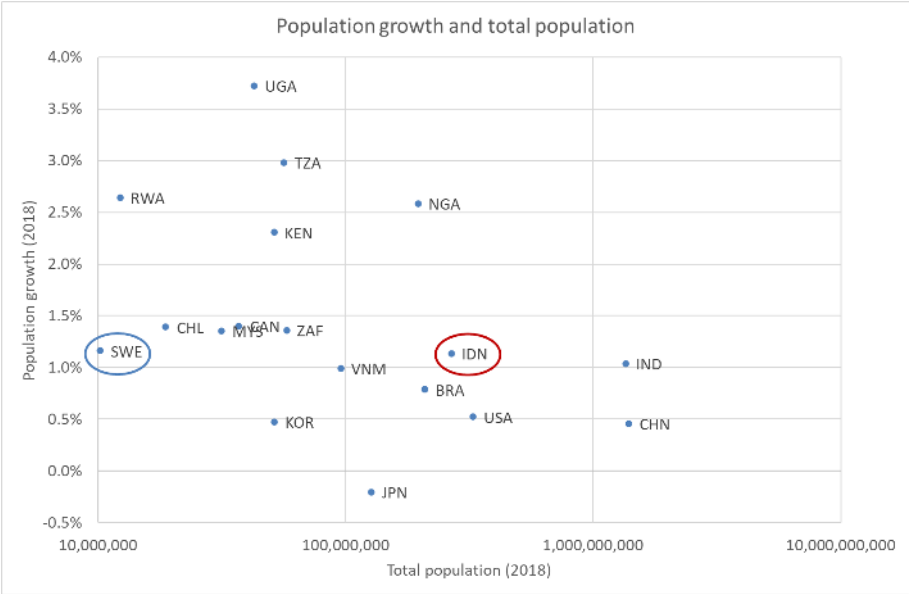
The industry mainly serves the huge domestic market, and its share of the gross domestic product (GDP) grows. A large and growing young population, combined with a growing middle class, leads to an increased demand for higher education. Currently, Indonesia struggles to provide inclusive, high-quality education to its citizens. The country has much lower literacy levels than those of other Southeast Asian nations. To some extent, Indonesian students go abroad, partly on government programmes.

Until relatively recently, the Swedish International Development Cooperation Agency had included Indonesia in its aid programmes, which has also led to collaboration between Indonesian and Swedish universities.

Population and economic development

According to UN data, Indonesia's population was estimated at 273.5 million people in 2020, equivalent to 3.51% of the total world population, or the fourth most populous country in the world.

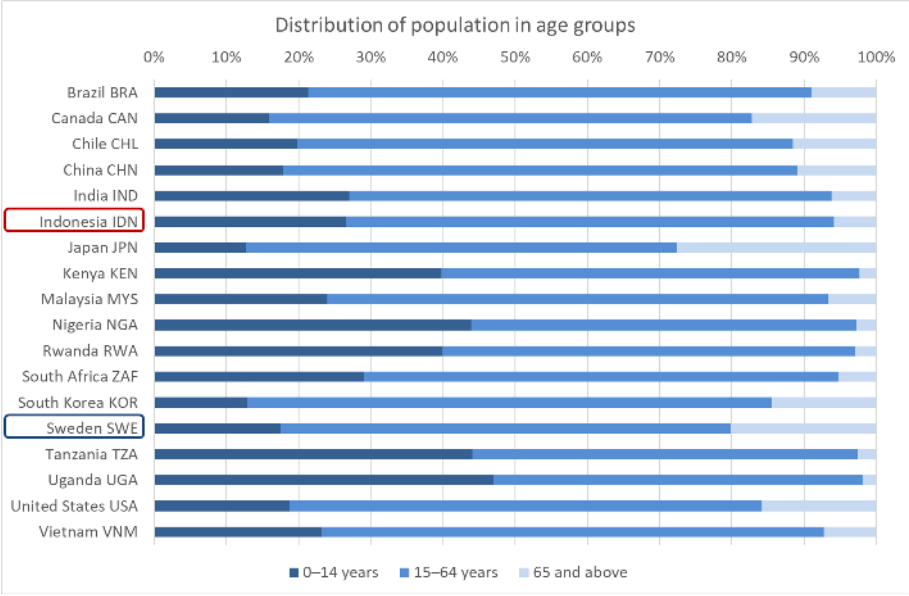
Figure 1: **Total population (logarithmic scale) and population growth**



In the early 1970s, fertility rates in Indonesia were around 5.6 children per women. In 1967, the government launched a family planning programme to combat poverty and improve quality of life. This is still considered exemplary, especially given the highly heterogeneous population spread across over 17,000 islands. Within a decade, the fertility rate had dropped to 4.7 and by the early 1990s, it stood at 3.0. The trend has levelled out and annual population growth is now hovering around 1.1%.

Indonesia has long been a major source of migrant labour in the Asia-Pacific region and beyond. According to the World Bank, an estimated 9 million Indonesians worked overseas in 2016, accounting for almost 7% of the country's labour force.

Figure 2: **The percentage of the population in each age group**

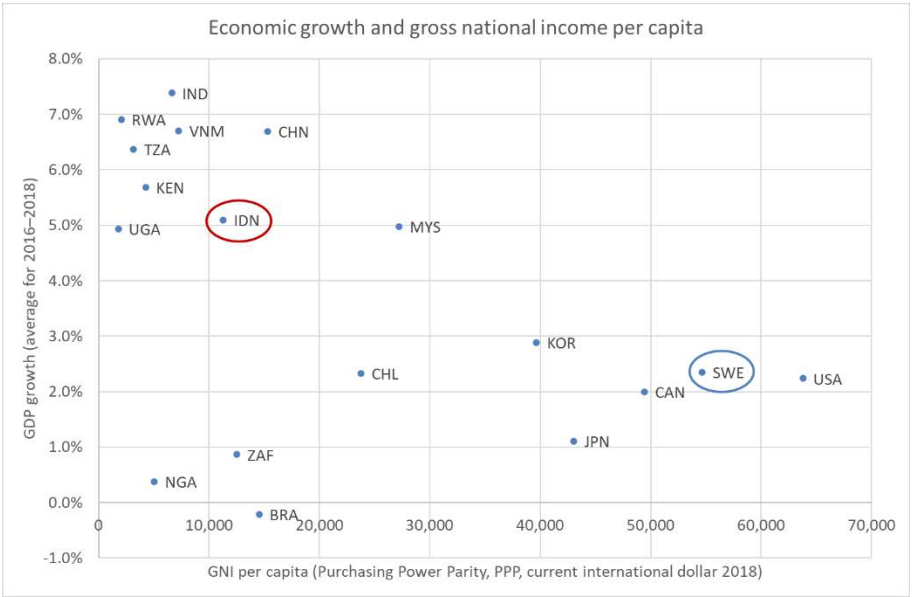


Indonesia has a young population with a median age of 29; less than 10% of the population is aged over 65 (see Figure 2). Its working-age population is projected to continue to increase as a share of the total population until 2030.

This young, growing workforce will need quality jobs. Structural reforms to accelerate growth are called for so that the country can grow prosperous by reaping its demographic dividend before the population ages. International bodies such as the International Monetary Fund have identified the need to improve the quality of education and ease labour regulations as critical in providing young people with job opportunities.

The country has made considerable gains in poverty reduction in recent decades, cutting the poverty rate by more than half since 1999, to 9.78% in 2020.

Figure 3: **Gross national income (GNI) and gross domestic product (GDP) growth**

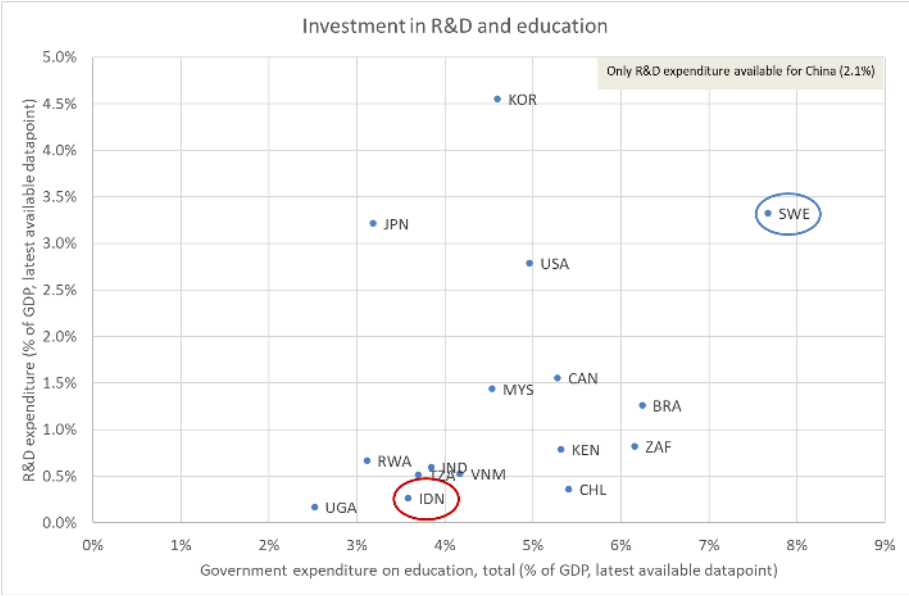


Indonesia is the world's tenth largest economy in terms of purchasing power parity. The country remains one of the fastest-growing emerging market economies, with growth stabilising at around 5% since 2014 – about 0.7 percentage points lower than in the previous decade.

Indonesia has a mixed economic system which includes a degree of private freedom, combined with centralised economic planning and government regulation.

In terms of value added, the industrial sector is the most important, and significant foreign direct investment and government incentives have positioned the industry for future growth. Major industrial sectors include petroleum and natural gas, textiles and apparel, mining, footwear, plywood, rubber, and chemical fertilisers. The services sector is equally important while agriculture's share has declined over the last fifty years and now only accounts for around 14%.

Figure 4: **Expenditure on education and research and development (R&D), both as a percentage of GDP; data predominantly for 2017 or 2018**



The Indonesian government's expenditure on education is less than 4% and that on research and development (R&D) less than 0.5% of GDP. These are low percentages when compared internationally. For instance, the expenditure for education and R&D in neighbouring Malaysia is about 4.5% and 1.5% of GDP, respectively. By comparison, Swedish expenditure is more than 7% of GDP for education and more than 3% of GDP for R&D (see Figure 4).

Higher education institutions in Indonesia

Indonesia has a rapidly growing and diverse higher education landscape. Nearly 4,500 higher education institutions (HEIs) enrol eight million students (2017). About 16% of the institutions were faith based in 2015, including 11 public and 95 private universities. More than 90% of HEIs in Indonesia are privately owned. However, many private institutions are very small. Public institutions tend to have a better reputation in Indonesia as well as internationally.

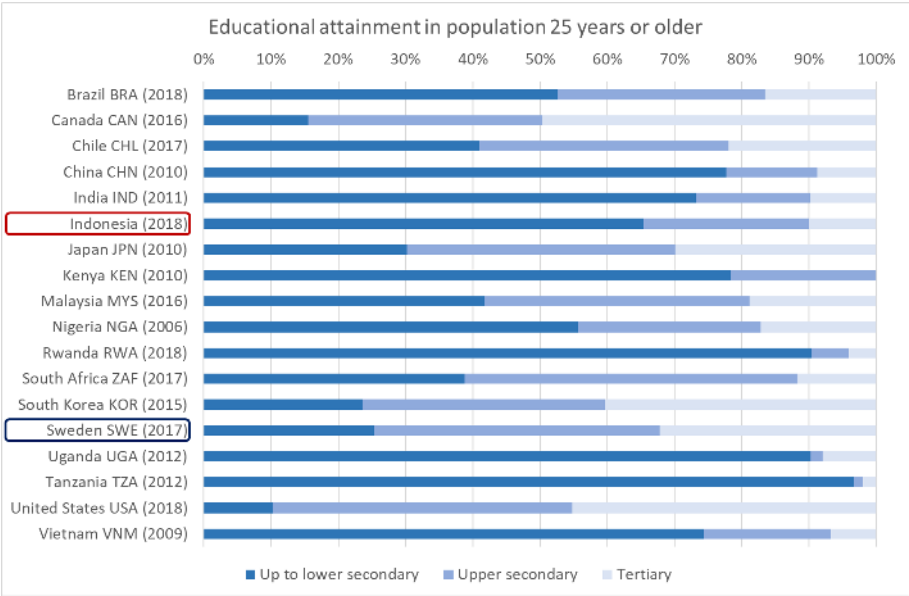
The University of Indonesia with its main campus in the Jakarta area is the highest ranked Indonesian university at 801–1000 in the *Times Higher Education* World University Ranking 2021. Another four institutions are ranked in the groups 1001+, among them Bandung Institute of Technology and Universitas Gadjah Mada. All five ranked institutions are public.

Spending on tertiary education and research is low, with universities receiving only 9% of all education allocations in 2018. Since most students are enrolled in fee-charging private institutions, Indonesian households bear the brunt of tertiary education expenditures. Even public HEIs rely increasingly on tuition fees to secure resources. High financial burdens on private households tend to perpetuate social inequalities in Indonesia.

Research publication volumes in Indonesia are rapidly increasing from a relatively low level. This rapid increase mainly comprise publications authored by Indonesian researchers, and consequently the share of international co-publications is decreasing. Globally, this share has steadily been increasing over many years and Indonesia is thus an outlier. The situation may be partly explained by the fact that Indonesia now has the capacity to produce internationally competitive research domestically.

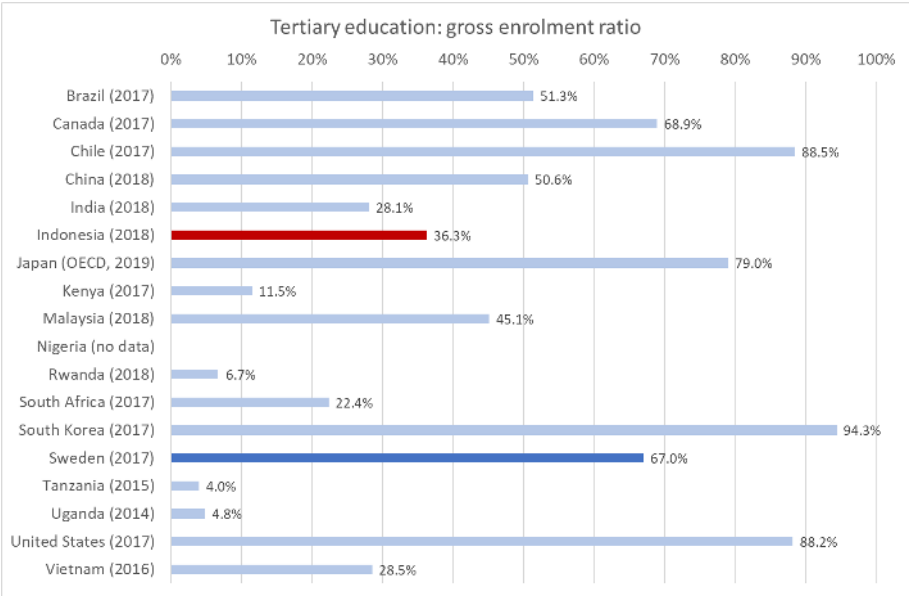
Educational attainment and student mobility

Figure 5: **Educational attainment**



In Indonesia, about 25% of the population (25 years or older) had attained upper secondary education in 2018 and about 10% had attained tertiary education. These numbers are lower than for neighbouring Malaysia (see Figure 5). By comparison, in Sweden about 40% of the population had attained upper secondary and more than 30% tertiary education (2017).

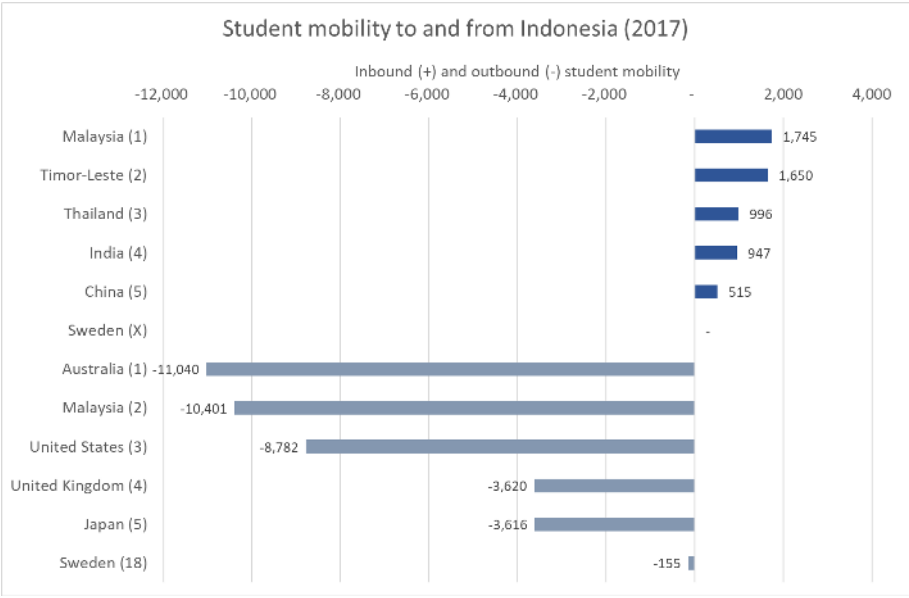
Figure 6: **Gross enrolment ratio for tertiary education**



The gross enrolment ratio (GER) for tertiary education is indicated in Figure 6. This is the ratio of students enrolled in tertiary education divided by the 5-year age group starting from the official secondary school graduation age. The GER indicates the capacity of the education system to enrol students of a particular age group.

In Indonesia, the GER for tertiary education is 36.3%, which is significantly lower than that of neighbouring Malaysia at 45.1%. The corresponding GER for Sweden is 67%.

Figure 7: **Inbound and outbound students, origins, and destinations**



The inbound students to Indonesia come mainly from neighbouring Asian countries, as can be seen in Figure 7. Malaysia and Timor-Leste top the list of foreign students in Indonesia. The outbound students, who constitute a much larger part than the inbound, go to various countries. The most popular study destinations abroad for Indonesian students are Australia, Malaysia, and the United States.

Figure 8: **Inbound and outbound students to and from Sweden per year**

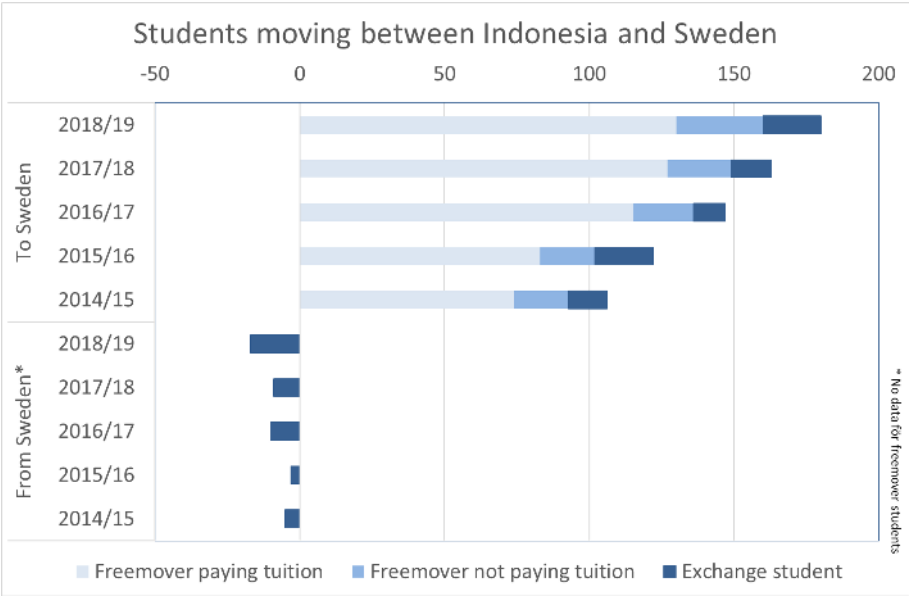


Figure 8 illustrates the inbound and outbound students to and from Sweden and Indonesia. Data from both sides show that the number of exchange students has increased in recent years. However, Indonesia remains an uncommon study destination for Swedish students. The number of outbound students is small, with roughly 20 students from Sweden doing a study exchange in Indonesia in the academic year 2018/19. The number of students from Indonesia studying in Sweden has steadily increased in recent years.

Figure 9: **Inbound and outbound students to and from Sweden 2018/19, per higher education institution**

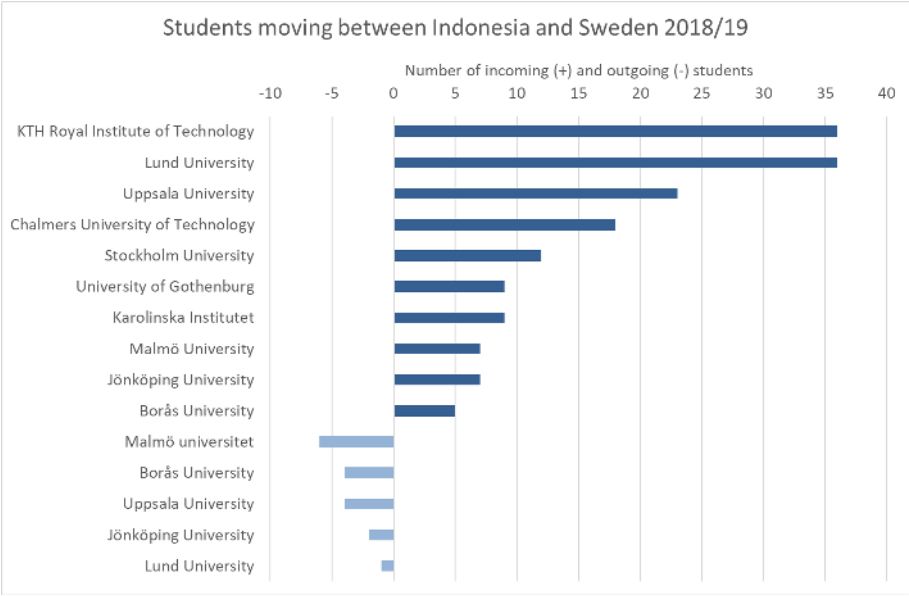


Figure 9 illustrates the inbound students from Indonesia to specific Swedish HEIs. By far the highest number of students go to KTH Royal Institute of Technology and Lund University. The outbound students, comprising of exchange students from Swedish HEIs, mainly come from smaller HEIs such as the University of Borås, Malmö University and Jönköping University. Some outbound students also come from Uppsala University and Lund University.

Research and collaboration with Sweden

Indonesian scientific production constitutes less than 1% of the world total, while Indonesia's share of the world population is 3.5%. The country has seen a significant growth in annual publication output, averaging 54.3% per year in the period 2015–2019. Indonesia's field-weighted citation impact (FWCI) is 0.92, which is similar to that of countries such as Brazil and Malaysia. The country's share of international co-publications, as measured by the field-weighted internationalisation score (FWIS), is 0.52.

Table 1: **Selected publication indicators**

Based on publications 2015–2019							
Country	**Annual publication volume (average)**	**Share of world**	**Annual volume growth 2015–2019**	**Citation impact**	**Share of int'l co-publ**	**Share of ac.-corp. co-publ.**	**Collaboration intensity with Sweden**
		%	**%**	**FWCI**	**FWIS**	**%**	**$NCII_{100}$**
Brazil	79,128	2.54%	4.4%	0.90	0.79	2.1%	72%
Canada	110,493	3.55%	2.0%	1.51	1.31	4.2%	75%
Chile	13,929	0.45%	5.9%	1.22	1.42	2.0%	70%
China	559,913	17.98%	8.7%	1.02	0.55	2.4%	47%
India	164,707	5.29%	6.5%	0.82	0.43	1.2%	55%
Indonesia	24,572	0.79%	54.3%	0.92	0.58	0.7%	31%
Japan	133,011	4.27%	1.0%	0.95	0.69	5.4%	70%
Kenya	3,082	0.10%	7.2%	1.73	1.92	4.5%	124%
Malaysia	32,636	1.05%	5.8%	1.01	1.06	1.5%	30%
Nigeria	8,476	0.27%	14.0%	0.98	1.17	1.3%	36%
Rwanda	427	0.01%	11.2%	3.30	2.40	5.2%	203%
South Africa	24,423	0.78%	6.2%	1.26	1.29	2.9%	111%
South Korea	85,265	2.74%	2.0%	1.05	0.69	4.5%	35%
Sweden	42,975	1.38%	2.2%	1.68	1.55	8.3%	n/a
Tanzania	1,660	0.05%	7.8%	1.81	1.98	3.4%	178%
Uganda	1,741	0.06%	7.1%	1.76	2.04	4.8%	170%
United States	685,704	22.02%	0.9%	1.42	0.86	4.7%	74%
Viet Nam	7,649	0.25%	24.9%	1.43	1.67	2.2%	40%
World	3,113,580	100.00%	2.8%	1.00	1.00	2.6%	n/a

See the Appendix for detailed explanations of some of the indicators in Table 1.

Figure 10: **Annual co-publications per number of co-authors**

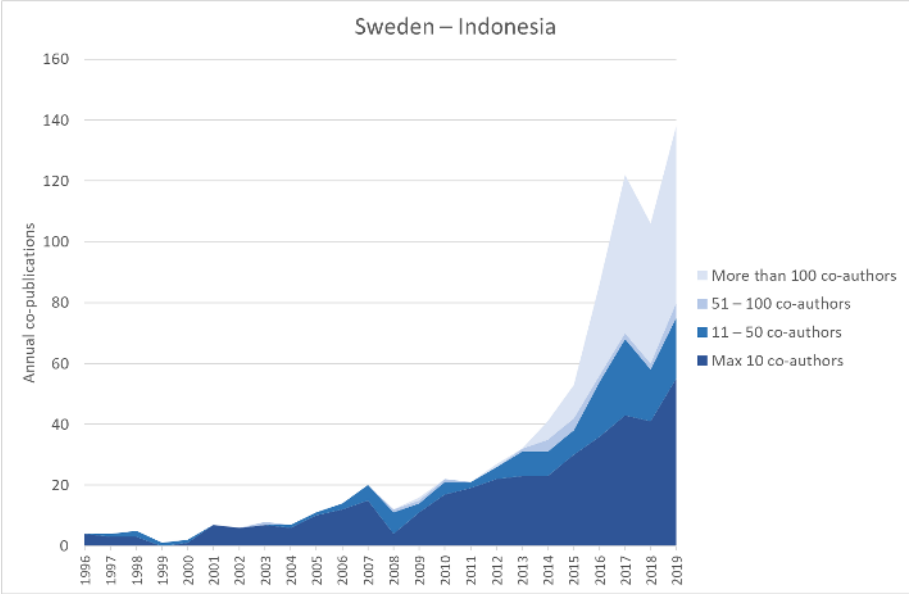
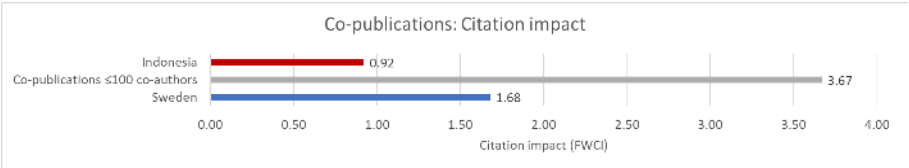


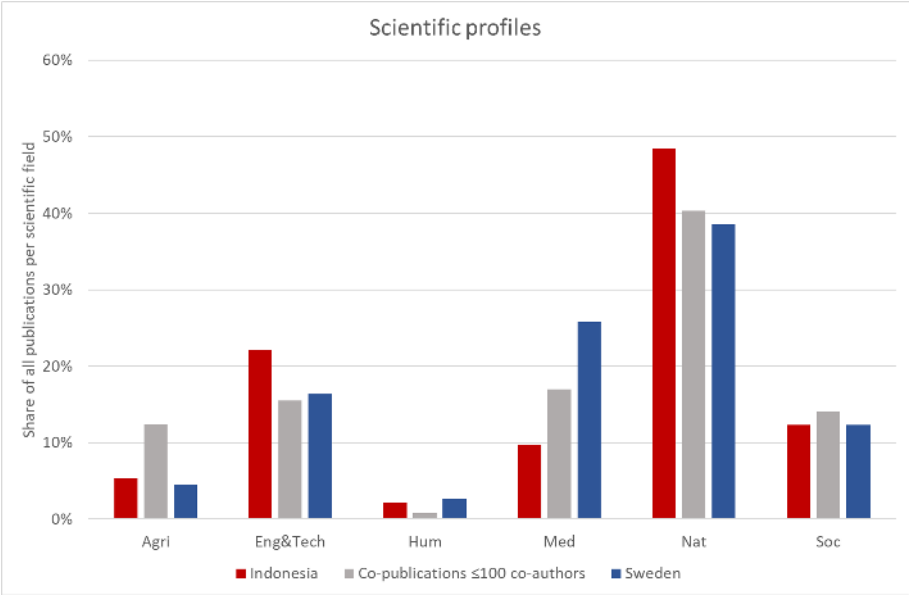
Figure 11: **Field-weighted citation impact for each country and their co-publications with ≤100 co-authors (2015–2019)**



There is a rather small number of co-publications involving Sweden and Indonesia, and these are dominated by either very large cooperations with more than 100 co-authors or small cooperations with up to ten co-authors, as indicated in Figure 10. During the last decade there has been a drastic increase in the number of co-publications between Sweden and Indonesia, especially regarding very large cooperations with more than 100 co-authors. Both Sweden and Indonesia benefit when researchers work together; co-publications (with up to 100 co-authors) have a significantly higher FWCI than that of each country, as can be seen in Figure 11.

In 2014, STINT, together with the Embassy of Sweden in Indonesia, organised a university presidents' delegation to promote academic cooperation between the two countries.

Figure 12: **Distribution of publications per scientific field (2015–2019)**



In Figure 12, the scientific profiles of research collaborations between Sweden and Indonesia are compared with the overall profiles of these countries in various fields. For example, approximately 10% of the publications with Indonesian participation are within medicine. In Sweden, the share is clearly higher at 26%. If all scientific fields collaborated internationally to the same extent, the shares of co-publications involving both countries would typically lie between the national shares, as is the case in medicine and the natural sciences. The agricultural sciences are overrepresented in Swedish–Indonesian collaborations. Compared to almost all other Swedish bilateral collaborations studied, the share of co-publications in the social sciences is very high.

The large share of co-publications in the agricultural sciences is surprising and the question is whether specific funding has been allocated for collaboration in this field. However, it should be noted that the overall

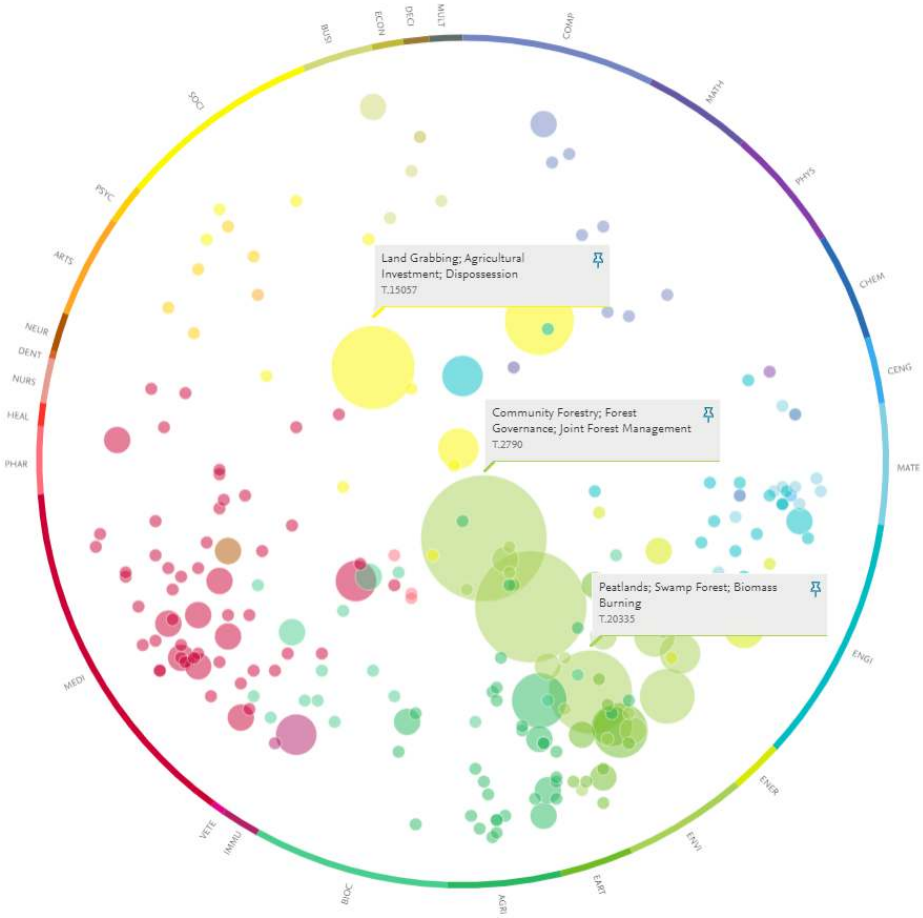
numbers of co-publications are relatively small, which contributes to greater variation.

Figure 13: **Word cloud based on co-publications with ≤100 co-authors (2015–2019)**

The word cloud in Figure 13 was produced using Elsevier's Fingerprint Engine. It shows the most prominent keyphrases occurring in publications with co-authors affiliated to Swedish and Indonesian institutions, based on their titles, abstracts, and keywords. Large, green words signal highly relevant and growing keyphrases. Given the overall growth in co-publications between Sweden and Indonesia, most keyphrases are green.

'Indonesia' is the most prominent keyphrase whereas 'Sweden' is not included. One interpretation is that the research done in collaboration between the countries has a stronger focus on the Indonesian context. Other keywords such as '*Elaeis guineensis*' (the African oil palm), 'agroforestry', 'dengue', 'tropical' and 'rain forest' confirm the focus on predominantly Indonesian topics. Several keyphrases address environmental and agricultural topics, while a few further prominent keyphrases pertain to health issues.

Figure 14: **Wheel of science based on co-publications with ≤100 co-authors (2015–2019)**



Publications involving Swedish and Indonesian researchers are predominantly in the green environmental disciplines, as can be seen in the wheel of science in Figure 14. The large bubbles in the centre of the circle indicate that a substantial part of research collaboration is multidisciplinary. Their sizes indicate that a high share of all included co-publications are on these topics. All three labelled bubbles pertain to agricultural topics. There are almost no purple bubbles, indicating limited collaborative research in physics.

Table 2: **The 20 institutions in Sweden with the highest share of co-publications with ≤100 co-authors (2015–2019). Only institutions with at least 300 publications during the period are included**

Institution	Co-publications with Indonesia (≤100 co-authors)	Share of all publications at the Swedish institution	FWCI
University of Borås	19	1.9%	1.21
Stockholm Environment Institute	6	0.9%	1.77
Royal Swedish Academy of Sciences	2	0.5%	142.72
Swedish University of Agricultural Scienc	32	0.4%	2.66
Swedish Museum of Natural History	4	0.3%	1.98
SP Technical Research Institute of Swec	2	0.3%	1.09
Linnaeus University	10	0.3%	1.94
ABB Corporate Research	2	0.2%	0
Dalarna University	2	0.2%	3.29
Stockholm University	33	0.2%	6.05
Swedish Meteorological and Hydrologica	1	0.2%	1.17
Chalmers University of Technology	22	0.2%	1.28
Umeå University	18	0.1%	1.45
Jönköping University	3	0.1%	0
Uppsala University	37	0.1%	2.29
Lund University	37	0.1%	1.92
University West	1	0.1%	0.41
Södertörn University	1	0.1%	0.61
Karlstad University	2	0.1%	0.24
KTH Royal Institute of Technology	20	0.1%	1.42

Table 2 ranks Swedish HEIs and research institutes based on their co-publications with Indonesia (with up to 100 co-authors) as a share of their total publication output. With only two exceptions, all Swedish institutions listed have a co-publication share significantly below Indonesia's global publication share (0.79%), which explains Indonesia's very low collaboration intensity with Sweden of 31% (see Table 1). As Indonesia's total publication volume is small, the net result is a very low number of co-publications overall.

Figure 15: **Top ten Swedish institutions with the highest number of co-publications with ≤100 co-authors (2015–2019)**

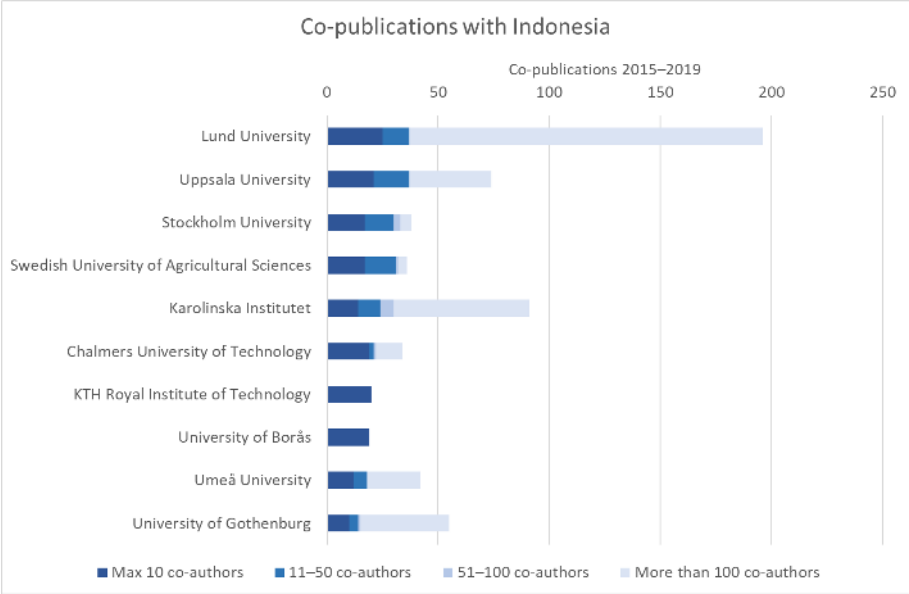


Figure 15 lists the ten Swedish universities with the highest numbers of co-publications with Indonesia, ranked according to the number of co-publications with up to 100 co-authors. These are almost identical to the top ten Swedish universities by overall publication volume, with some differences in the ranking order. The one exception is the University of Borås, which is also the Swedish institution that has by far the highest share of co-publications with Indonesia (as seen in Table 2), all of which originate from a single collaboration involving the Swedish Centre for Resource Recovery. We also note that the University of Borås is one of the HEIs sending the highest number of exchange students from Sweden to Indonesia (see Figure 9). Most co-publications with more than 100 authors are from large-scale global studies in the field of medicine. In the case of Lund University, however, the majority of co-publications with more than 100 co-authors are in the field of particle physics.

Figure 16: **Top ten Indonesian institutions with the highest number of co-publications with ≤100 co-authors (2015–2019)**

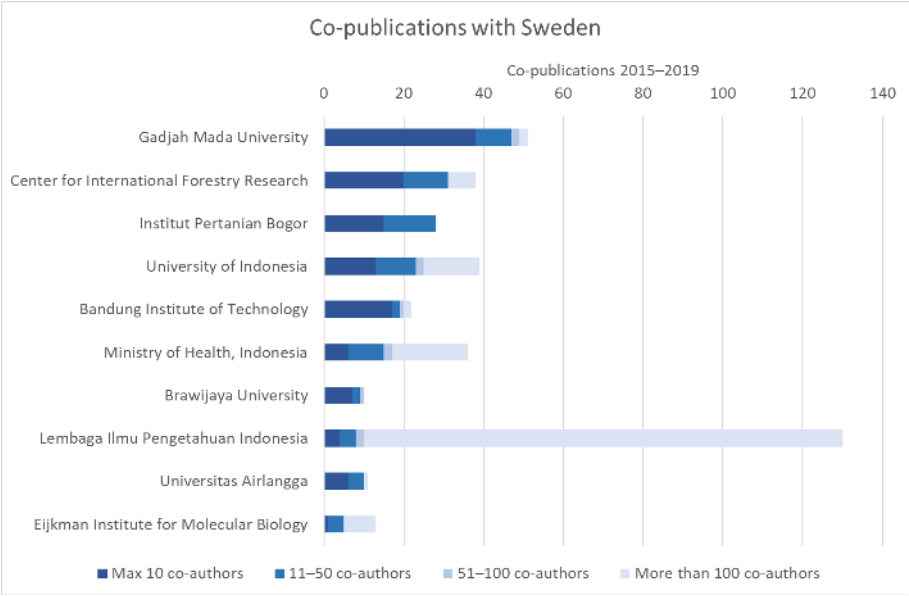


Figure 16 lists the ten Indonesian universities with the highest numbers of co-publications with Sweden, ranked according to the number of co-publications with up to 100 co-authors. Seven of these[1] are among the top ten Indonesian universities by overall publication volume and three[2] rank among the top 500 universities in the world in the QS World University Ranking. Lembaga Ilmu Pengetahuan Indonesia's high number of publications with more than 100 authors are all in the field of particle physics.

[1] Gadjah Mada University, Institut Pertanian Bogor, the University of Indonesia, Bandung Institute of Technology, Brawijaya University, Lembaga Ilmu Pengetahuan Indonesia and Universitas Airlangga.

[2] Gadjah Mada University, the University of Indonesia, and Bandung Institute of Technology.

Table 3: **Co-publication matrix for the top ten in both countries showing the number of co-publications with ≤100 co-authors (2015–2019)**

Publications 2015–2019 with up to 100 co-authors	Gadjah Mada University	Center for International Forestry Research	Institut Pertanian Bogor	University of Indonesia	Bandung Institute of Technology	Ministry of Health, Indonesia	Brawijaya University	Lembaga Ilmu Pengetahuan Indonesia	Universitas Airlangga	Eijkman Institute for Molecular Biology	With Indonesia
Lund University	2	3	9	3	1	-	5	2	5	-	37
Uppsala University	6	2	4	5	-	1	2	4	1	-	37
Stockholm University	1	12	3	1	-	5	-	2	-	1	33
Swedish University of Agricultural Sciences	1	16	6	1	-	-	2	2	-	-	32
Karolinska Institutet	7	-	-	2	1	4	1	-	1	-	30
Chalmers University of Technology	13	2	1	-	6	-	-	-	-	-	22
KTH Royal Institute of Technology	-	-	-	1	7	-	-	-	1	-	20
University of Borås	13	-	-	-	2	-	-	-	-	-	19
Umeå University	13	-	-	1	-	2	-	-	1	-	18
University of Gothenburg	-	5	-	-	-	-	-	2	-	-	15
With Sweden	49	31	28	25	20	17	10	10	10	5	306

The co-publication matrix in Table 3 shows the co-publications (with up to 100 co-authors) between the top ten collaborating institutions in Sweden and Indonesia and thus gives an indication of the distribution of collaborations between Swedish and Indonesian HEIs and research institutes. The blue/green bars represent the ratio of the number of co-publications between two HEIs/research institutes to the total number of co-publications (for the Swedish institution). About two thirds of the Swedish co-publications with up to 100 co-authors are with the top ten Indonesian collaborating institutions, and one third with the top three. Overall, the research collaboration between Indonesia and Sweden cannot be said to be broadly distributed and the co-publication pattern that can be seen in Table 3 indicates that collaborations between Indonesia and Sweden are dominated by a smaller number of partnerships between specific research groups.

Appendix: Data and methods

Data

The report is based on data from the following organisations, accessed in June/July 2020:

- Population and economic data: World Bank, see https://databank.worldbank.org/home.aspx
- Educational attainment and student mobility: UNSCO, see http://data.uis.unesco.org, and the Swedish Higher Education Authority (UKÄ), see https://www.uka.se/statistik--analys/statistikdatabas-hogskolan-i-siffror.html (with one data point from the OECD for Japan)
- Research: Publication data from Scopus, the broadest available publication database, see https://www.elsevier.com/solutions/scopus?dgcid=RN_AGCM_Sourced_300005030

In some cases, there are clear differences in the student mobility data from UNESCO and UKÄ. Different reporting periods and definitions (see below) might explain some of these differences.

Methods

According to the UNESCO Institute for Statistics, an internationally mobile student is an individual who has physically crossed an international border between two countries with the objective to participate in educational activities in a destination country, where the destination country is different from his/her country of origin. For measuring international mobility in education, UNESCO, the OECD and Eurostat have agreed that the preferred definition of the country of origin should be based on students' educational careers prior to entering tertiary education. See http://uis.unesco.org/en/methodology#Q5

The research section includes several indicators and figures that might require further explanation.

Table 1, Selected publication indicators. The annual growth is calculated by using linear regression to approximate the volume development during the period 2015–2019. The field-weighted citation impact (FWCI) is a normalised indicator comparing the citations a publication receives with other publications in the same scientific field, from the same year, and in the same type of publication. If the FWCI is above one, the publication is more frequently cited than the world average, and vice versa. The field-weighted internationalisation score (FWIS) is normalised in a similar manner. A FWIS above one means that the publications are more international (include more international co-authorships) than the world average, and vice versa.[3] Academic–corporate co-publications include at least one academic and one corporate affiliation and at least two co-authors. Finally, the normalised collaboration intensity index (NCII) illustrates how the collaboration differs from a situation when Sweden (or another entity) collaborates with all countries in proportion to their share of all international co-publications globally. For example, authors with an affiliation in the United States participate in 16% of all international co-publications globally. In Sweden's international co-publications, the share of US co-authors is 11%. The NCII is calculated as the actual share divided by the 'expected' share, i.e. 11/16 = 67%, which indicates that US collaboration is underrepresented in Sweden's portfolio of international co-publications.[4]

Figure 12, Distribution of publications per scientific field (2015–2019). The scientific profile is calculated using the OECD categorisation of publications in six scientific fields: agricultural sciences, engineering and technology, humanities, medical sciences, natural sciences, and social sciences. For each field, the share of publications is calculated using the

[3] For more details, see Pohl, H., Warnan, G. and Baas, J. (2014), 'Level the playing field in scientific collaboration with the use of a new indicator: Field-weighted internationalization score', *Research Trends* 39, 3–8.

[4] For a more detailed description, see Pohl, H. (2020), 'Collaboration with countries with rapidly growing research: supporting proactive development of international research collaboration', *Scientometrics* 122(1), 287–307. https://doi.org/10.1007%2Fs11192-019-03287-6

number of publications within the field and the total number of publications in the dataset.

The **word cloud (Figure 13)** is a feature in SciVal, which uses the Elsevier Fingerprint Engine to extract distinctive keyphrases within the publication set. For more information, see https://www.elsevier.com/solutions/elsevier-fingerprint-engine

The **wheel of science (Figure 14)** is another feature directly available in SciVal. Each bubble represents a topic. The size of the bubble indicates the output of the entity on that topic. The position of the bubble is based upon the All Science Journal Classification (ASJC) categories of the journals in which the scholarly output is published. The position is related to the topic as a whole and is not affected by the entity examined. The greater influence an ASJC has over a topic, the closer the topic is dragged to its side of the wheel. As a result, the topics closer to the centre of the wheel are more likely to be multidisciplinary, compared to the topics along the edge of the wheel.

Note that a topic may be placed at the edge of the wheel, but still be considered multidisciplinary because it is equally influenced by a number of ASJCs that are located on the same side of the wheel.

STINT, the Swedish Foundation for International Cooperation in Research and Higher Education, 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. STINT for example 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.

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