



# International research collaboration between South Africa and rest of the world: An analysis of 2012–2021 trends

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South African higher education policies have since 1997 called for the expansion of research collaboration with the African continent and Global South. In this article, the authors' analysed South Africa's international research collaboration trends and patterns during the 2012–2021 period. Focusing on co-authored scholarly publications, the authors' analysed bibliometric data from Scopus, highlighting the countries South African public universities have collaborated and produced knowledge with, and the parts of the world they have neglected in the past decade. The findings highlight the growth of South Africa's international research collaboration and the expansion of the number of countries universities collaborate with. While the past decade has seen a growth in research collaboration with Brazil, Russia, India, China and Nigeria, South African universities continue to be largely Eurocentric and prioritise collaboration with the Global North while sidelining research collaboration with the African continent and Global South.

**Contribution:** The findings presented in this article contribute to an understanding of South Africa's international research collaboration footprint during 2012–2021 and highlight which parts of the world should be prioritised by universities in the expansion of research collaboration in the future.

**Keywords:** international research collaboration; academic publishing; co-authorship; internationalisation; South Africa.

## Introduction

International research collaboration (IRC) contributes to the exchange of ideas across borders and development of new knowledge. International research collaboration is seen as the cornerstone of higher education and science globally (Kwiek 2021). Mouton, Prozesky and Lutomiah (2018) and Onyanha (2021) argue that IRC positively impacts the quality of research and education, while it also contributes to better visibility of scholarly research (Asubiario 2019; Pouris & Ho 2014). While international collaboration provides numerous opportunities for universities to engage, network and collaborate with institutions across the globe, it can also contribute to the reinforcement of historical and contemporary power dynamics and inequalities in knowledge production (Zezeza 2012). This, in turn, can entrench global and regional systemic and structural inequalities and inequities in research collaboration and knowledge production.

South Africa is a prime example of such phenomena. As a result of colonial and apartheid impositions and influences, historical and contemporary global inequalities, and the Eurocentric hegemony in higher education and knowledge production, South African universities tend to engage and collaborate primarily with their counterparts in the Global North, while neglecting the collaboration with institutions and researchers on the African continent and the rest of the Global South (Maringe & Ojo 2017; Schoole 2006). Reasons for this can be found in the colonial roots of higher education and the violent, racist and segregationist nature of apartheid, which disconnected the country from the rest of the African continent and much of the Global South up until 1994. In addition, coloniality, neoliberal impositions and the lack of adequate funding for intra-Africa and South–South collaboration, combined with the lack of epistemic transformation and decolonisation in higher education, have negatively impacted academic relations, engagements and collaboration between South Africa, the African continent and most parts of the Global South (Heleta 2023).

Various South African higher education policies and strategic plans have since 1997 called for the expansion of international research collaboration between the country and the African continent

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and Global South, while continuing to maintain links and collaborations with other parts of the world. In this article, the authors explore how far the South African higher education system has advanced when it comes to these calls. Focusing on co-authored scholarly publications, this study covers the 2012–2021 period and analyses bibliometric data from Scopus from 24 South African public universities, highlighting the countries and parts of the world they have collaborated and produced knowledge with, and the parts of the world they have neglected in the past decade. This article builds on the research by Onyancha (2011), who studied the trends in South Africa's IRC between 1986 and 2005 and Mouton et al. (2019), whose study focused on South Africa's research landscape, including IRC, between 2000 and 2016.

The 2012–2021 time period is significant as it covers the years before and after the #RhodesMustFall and #FeesMustFall protests of 2015–2016. During this time, South African higher education system experienced large-scale disruptions and calls for dismantling of Eurocentric domination in higher education and decolonisation of knowledge, among other things (Heleta, Fatyela & Nkala 2018). #FeesMustFall student activists called for decolonisation through dismantling of Eurocentric epistemic hegemony (Ndlovu-Gatsheni, 2018) and including Africa in everything South African universities do (Heleta 2018; Mbembe 2016). This study of IRC trends and patterns over the past decade, and the extent to which South African universities collaborate with the African continent and the Global South on co-authorship of new knowledge, will provide an important indication of where the decolonial project is at this point in time. The authors are interested to see whether there are any significant changes in IRC trends since 2016 that show if progress has been made on increasing academic collaboration with the African continent and the Global South.

Using the Scopus bibliometric data and the SciVal analytics platform, this study focuses on the: (1) analysis of South African knowledge production trends and patterns in the 2012–2021 period; (2) identification of top countries the South African public higher education system has collaborated with on co-authorship of academic publications; (3) examination of annual collaboration trends; (4) examination of trends and patterns in South Africa's international co-authorship of academic publications in terms of world regions and groupings. In terms of the structure of the article, the next section will describe the methodology used in this study. This will be followed by a discussion of the relevant literature on the trends in South Africa's IRC. The authors will also unpack post-1994 policies and strategic plans that discuss research priorities in South African higher education, including IRC priorities and focus areas. The findings section will unpack and discuss the results from this study. The authors will end the article with concluding remarks and recommendations for future research.

## Research methods and design

Research collaboration plays a key role in scholarly engagement and development of new ideas, knowledge and

innovation. Research collaboration is measured by analysing bibliometric data, trends and patterns in co-authorship of academic publications (Mouton et al. 2019). This can include collaborations within an institution, country or international collaborations. International research collaboration refers to international co-authorship of academic publications involving two or more researchers from at least two different countries (Kwiek 2021). It is important to note that co-authorship of publications and the analysis of bibliometric data do not tell a full story about the extent and depth of international collaboration in higher education. For example, co-authorship of articles that emerge from large scientific projects that involve 100's of scientists do not necessarily involve genuine collaboration, but only sharing of data and small contributions by scholars from different parts of the world to research projects (Kahn 2018; Mouton et al. 2019). While co-authorship of scholarly publications is not the only way to measure IRC and international engagements in higher education, it remains one of the main indicators for assessment of the extent of research engagements and collaborations involving academics and researchers (Hedt-Gauthier et al. 2019).

For examination and analysis of South Africa's IRC trends and patterns over the past decade, the authors have used Scopus data and the SciVal online analytics platform, which provides access and tools for a comprehensive analysis and visualisation of research performance, benchmarking, exploration of research trends and patterns, and in-depth analysis of academic collaboration across the world. SciVal can be used for institutional, national or international analysis of research trends and patterns over different time periods. SciVal uses the publication and citation data from Scopus, one of the largest curated bibliometric databases in the world. In 2020, Scopus database had over 76 million publication records, with around 3 million new records added to it annually. Scopus contains records from academic publishers from all parts of the world (Baas et al. 2020). Scholarly output listed in Scopus refers to the number of publications in academic journals, books, book series, conference proceedings and trade journals from different publishers that are indexed by Scopus. The authors acknowledge that one of the main limitations of bibliometric research that uses Scopus or another similar database is that it does not include all scholarly output. Many journals and other scholarly sources, particularly those published on the African continent, are not indexed by Scopus. However, while bibliometric analyses of IRC have limitations, they remain an important methodology for assessing collaborations and co-authorship in higher education (Onyancha 2021) and offer an important glimpse about South Africa's IRC trends and patterns.

The data used in this study included all academic subject areas and all internationally co-authored publications by academics and researchers affiliated with 24 South African public universities indexed by Scopus. The data from the University of Mpumalanga and Sol Plaatje University (both established in 2014) is not included in this analysis as these

two universities were not indexed by Scopus in the second half of 2022 when the study was conducted. In addition, the authors were interested in broader publication trends since 2012 in order to assess the importance of international collaboration. For this, the figures for all publications by the South African public higher education system, including international, national and institutional collaborations and single authorships, were included. Apart from using SciVal for analysis of the data, the Scopus data were exported to a comma-separated values (CSV) file and the analysis of South Africa's IRC trends and patterns was performed in Microsoft Excel. In terms of the data analysed in this study, South Africa's Scopus-indexed research output through international collaboration for the 2012–2021 period was 117917 publications. The data analysed in this study were retrieved from Scopus on 26 July 2022.

### Ethical considerations

This study received an ethics waiver from the Ethics Committee of Durban University of Technology because the data used within this study is already available in the public domain.

## Trends in South Africa's international research collaboration

South Africa's complex and violent history has had a profound influence on the types and patterns of international collaborations and engagements at the country's universities. The South African higher education system and institutions were established after the colonial conquest. The institutions established by the colonisers were replicas of Dutch and British universities, their institutional and educational models, and curriculum (Maringe & Ojo 2017; Sehoole 2006). Colonial and apartheid universities have propagated Eurocentric knowledge and ideas, while sidelining African and other knowledges (Canham 2018). Despite the end of apartheid in 1994, institutional cultures and curriculum at South African public universities have remained largely Eurocentric (Canham 2018; Heleta 2018; Mbembe 2016) and much of country's academia continues to valorize Eurocentric knowledge as superior (Department of Education 2008; Modiri 2021).

When it comes to IRC, during colonial and apartheid times, South African universities, and particularly the historically white institutions, have collaborated almost exclusively with their counterparts in Europe and elsewhere in the Global North. Between the 1960s and 1990s, the international sanctions and academic boycott, which were part of the global struggle against apartheid, prevented much of international engagement and collaboration between South African academics and institutions and their counterparts in other parts of the world (Onyancha 2011). After the end of apartheid in 1994, when South Africa and its higher education institutions opened to the rest of the world, South African universities, academics and researchers continued to favour the engagements and collaboration with the Global North. At the same time, they largely neglected the

collaboration and epistemic engagements with the rest of the African continent and other parts of the Global South (Heleta 2022; Maringe & Ojo 2017; Ndlovu-Gatsheni 2021; Onyancha 2011; Sehoole 2006).

Research by Onyancha (2011) has investigated South Africa's IRC trends and patterns between 1986 and 2005, showing the changes in collaboration trends from the last decade of apartheid to the first decade of the post-apartheid period. This research has shown that, while during apartheid South African academia collaborated largely within the country because of the international academic boycott, research collaboration trends changed after 1994, with significant growth in international collaboration. In 1986, the total number of countries that South African universities collaborated with was 43; in 2005, this figure grew to 115 countries, including 46 countries in Africa. However, the majority of South Africa's IRC during the 1986–2005 period was with the Global North, with the top 10 countries being the United States, England, Germany, Australia, Canada, France, Netherlands, Belgium, Italy and Scotland. The IRC with the United States (5811 co-authored publications), England (3274) and Germany (2126) amounted to 66% of all IRC by South African researchers and academics that resulted in co-authored scholarly output during this time period. In the top 20 countries, the Global North was represented in the top 18 spots, with India (269 co-authored publications) at 19 and Brazil (260) at 20. The top African country was Zimbabwe (224 co-authored publications) at the 24th spot, followed by Namibia (180) at 26, Kenya (168) at 28, Nigeria (123) at 33 and Botswana (102) at 39. For comparison, the collaboration between South African academics and their Australian counterparts between 1986 and 2005 produced more co-authored scholarly publications than the collaboration with 46 African countries that the South African public higher education system collaborated with during this period.

The given figures show that collaboration with the Global North has been prioritised by South African institutions, academics and researchers during the last decade of apartheid and the first decade after 1994, while intra-Africa collaboration was largely neglected. Similar conclusions have been made by Mouton et al. (2019) in a comprehensive study about South Africa's academic research performance between 2000 and 2016. Their study included international collaboration, comparison with countries of similar size and population around the world, and an in-depth analysis of the state, performance and scholarly output of different fields of study in South African academia. They highlight that the most pressing challenges facing South African public higher education are insufficient investment by the government and a small research capacity within the country. They found that the countries of similar size around the world in most cases invest considerably more in research and innovation and have twice as many researchers per 1000 of the population. Despite these challenges, the South African higher education system continues to increase its scholarly output annually. When it comes to IRC, the study



by Mouton et al. (2019), using the Web of Science bibliometric data, highlights that South African universities have expanded their international co-authorship of scholarly publications from 34% of all output in 2000 to 52% in 2016. The study further indicates that most of the international research collaboration by South African researchers and academics during the 2000–2016 period was with the scholars and institutions outside the African continent.

Other relevant research that needs to be highlighted has explored the international collaboration trends between the African continent and the rest of the world, and the trends and patterns in intra-Africa academic research collaboration that results in scholarly publications. This is important as South Africa's research collaboration data are included in the studies that focus on research collaboration on the African continent. A study by Pouris and Ho (2014) has explored the state of research collaboration in Africa during the 2007–2011 period. They highlighted that over this time period, the internationally co-authored research output grew from 52% in 2007 to 58% in 2011. The study also explored IRC trends between African countries, pointing out the extent of IRC and the focus on collaboration with the countries and regions outside the African continent while largely neglecting intra-Africa research collaboration. Bibliometric research by Mouton and Blanckenberg (2018) shows that from the period 2005–2016, African researchers and scientists have collaborated primarily with their counterparts from outside the African continent (about 50% of co-authored articles) and with colleagues within their countries (about 40% of co-authorships). The intra-Africa research collaboration that resulted in research output and production of new knowledge was negligible during this period. Research by Vieira and Cerdeira (2022), which encompasses the 1990–2018 period, has found that in most African countries, the number of co-authored publications with collaborators from outside the continent far outstrips the number of publications through intra-Africa collaborations. Similar trends and patterns have been found in other studies focusing on IRC in Africa (Asubiario 2019; Hedt-Gauthier et al. 2019; Onyancha 2021).

Mouton et al. (2019:53) point out that international research collaboration on the African continent often 'reflects deeper issues around the political economy of science in a country or region.' Similarly, Pouris and Ho (2014:2181) write that the IRC on the African continent tends to be driven 'by the availability of resources and interests outside the continent' rather than the continental, regional, national and institutional priorities. A lack of funding for higher education, research and innovation is highlighted as one of the most pressing contemporary challenges facing African higher education and research sectors, which directly impacts the ability of researchers and institutions to engage in intra-Africa and South–South academic collaboration. As a result of the low investment in higher education and research on the African continent, higher education institutions often depend on

external funding for their research activities. This is creating dependencies on foreign donors and often forces African institutions and academics to align their research priorities to those of the donors and collaborate primarily with the institutions from donor countries, which are often based in the Global North (Beaudry, Mouton & Prozesky 2018; Mouton et al. 2019).

## International research priorities in South African policies and strategic plans

In this section, the authors highlight relevant higher education White Papers, policy documents and strategic plans that discuss research priorities in South African higher education, including the IRC priorities and focus areas. The *1997 Education White Paper 3: A programme for the transformation of higher education* outlines the vision for post-apartheid higher education in South Africa. The vision of the then Department of Education was to 'contribute to the advancement of all forms of knowledge and scholarship, and in particular address the diverse problems and demands of the local, national, southern African and African contexts, and uphold rigorous standards of academic quality' (1997:6). The White Paper stressed the need to rethink 'all existing practices, institutions and values' in order to transform them for the democratic era (Department of Education 1997:3). The document called for universities to prioritise in their research and other activities the challenges and needs of the South African society and the challenges and priorities of the African continent (Department of Education 1997).

The Department of Higher Education and Training's (DHET) 2013 *White Paper for post-school education and training* highlights IRC as one of the key aspects of internationalisation. The White Paper argues that international partnerships and research collaborations need to be expanded in order to enhance knowledge production and innovation in South Africa. The document called for the expansion of academic and student mobility within the Southern African Development Community (SADC) to promote collaboration in research, learning and teaching. The White Paper further encourages expansion of research collaboration between South African institutions, academics and researchers and their counterparts on the African continent, within the Brazil, Russia, India, China and South Africa (BRICS) grouping, and elsewhere in the Global South. This, the White Paper notes, should not prevent the maintenance of existing and establishment of new collaborations with the institutions and scholars in the Global North (DHET 2013).

The South African *National Development Plan 2030* notes that the country should prioritise socio-economic, geopolitical, diplomatic, educational and cultural engagements with the SADC region, the rest of the African continent, BRICS countries and other parts of the Global South, as well as maintain and expand its engagements with the countries in the Global North. The document calls for 'positioning South

Africa as one of the continent's powerhouses that would lead African development and influence in world affairs' (National Planning Commission 2013:239). The National Development Plan stresses that the South African government needs to facilitate the creation of an environment where the country's scholarly community can engage with their counterparts on the continent and beyond, to 'improve the intellectual resources and economic prosperity of the country and the region' (National Planning Commission 2013:256).

The Department of Science and Technology's (2019) *White paper on science, technology and innovation* highlights that 'South Africa's future is inextricably linked to that of the rest of the African continent,' and that the country's scientific community must invest in the expansion of intra-Africa and pan-African research and innovation linkages, partnerships and collaborations (2019:xi). The White Paper argues that the collaboration strategies between South African institutions and their counterparts on the continent need to prioritise strengthening of continental higher education, research and innovation systems and institutions. The document further calls for the promotion and sharing of intra-Africa research and innovation networks, platforms and infrastructure and development of pan-African innovation and research agendas that promote excellence and development based on continental needs, visions and priorities (Department of Science and Technology 2019).

The DHET's *Strategic Plan 2020–2025* mentions collaboration and partnerships in reference to the need to develop a responsive higher education system. This requires 'enhanced liaison and engagement with communities at local, regional and international levels, as well as socially responsive research, collaboration, partnerships and capacity building' (2020:29–30). This is the only mention of regional and international collaborations and the plan does not provide any specific information or strategic priorities. Finally, the *Policy Framework for Internationalisation of Higher Education in South Africa* (DHET 2019) highlights that one of its strategic aspirations is the enhancement of IRC:

[T]o contribute to an increase in knowledge production, intellectual property and innovation - in South Africa, in the SADC region, in the rest of the African continent and in the world. (p. 21)

Furthermore, the framework calls for the enhancement of intellectual diversity in all aspects of higher education, including through broadening international research linkages and partnerships (DHET 2019).

South Africa is also part of various continental initiatives and strategic plans, which include a focus on education and research. The *Continental Education Strategy for Africa: 2016–2025* (African Union 2016:8), for example, calls for the expansion of continental partnerships and collaboration in order to 'address continental challenges and promote global

competitiveness.' In addition, the strategy highlights that African countries need to honour their commitments to allocate 1% of Gross Domestic Product to research and innovation on the national level, and to provide adequate infrastructure and resources for research, innovation and development. When it comes to collaboration, the strategy stresses that international research and innovation cooperation, partnerships and engagement must be based on the continental interests, needs, priorities and ownership. Similarly, the African Union's Agenda 2063 calls for African universities to expand their collaborations and partnerships in order to strengthen higher education, research and innovation on the continent (African Union 2015). This is important if the African continent is to achieve its vision of improving the livelihoods of African people and becoming a 'strong, united and influential partner on the global stage, making its contribution to peace, human progress, peaceful co-existence and welfare' (African Union 2015:15). In all this, the expansion of intra-Africa research collaboration, while also continuing to strengthen and expand linkages and collaborations with the countries in the Global South and elsewhere in the world, is of utmost importance.

## Results and discussion

### South African knowledge production trends and patterns between 2012 and 2021

In this section, the authors examine South African knowledge production trends and patterns for the 2012–2021 period. Using the Scopus data, the authors analyse the overall international, national and institutional co-authorship and single author authorship trends, patterns and figures for the public higher education sector. The authors also unpack annual scholarly output figures and the proportion of the scholarly output that results from IRC.

Figure 1 shows that during the 2012–2021 period, IRC has dominated research endeavours in South African public higher education. Creation of new knowledge through international collaboration makes up almost half of the

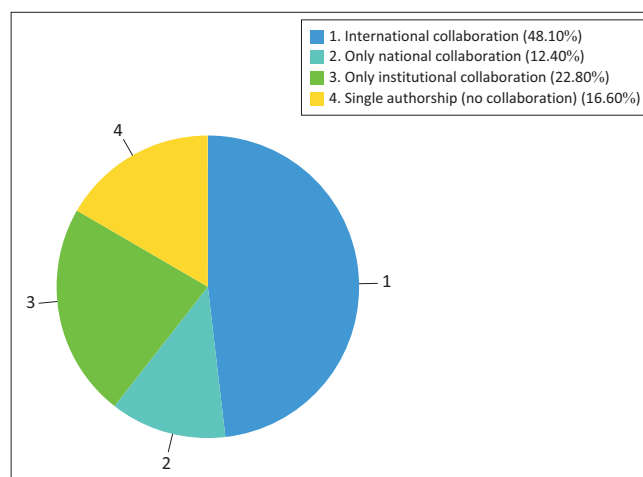


FIGURE 1: South Africa's research output (2012–2021).

scholarly output in the country. This is followed by institutional collaboration at 22.8%, single authorship at 16.6% and national collaboration at 12.4%. An in-depth look at the annual trends over the past decade is shown in Table 1.

Table 1 shows that between 2012 and 2021, the overall research output produced by 24 South African universities that are indexed by Scopus has doubled. The proportion of the research output produced through IRC has also been increasing from 42.4% in 2012 to 54.1% in 2021. Apart from a small decline in 2014, every other year has seen growth. The highest growth of 2.8% took place in 2015, following a decline in the previous year. The second highest annual growth of 2.4% took place in 2021. It is possible that the incorporation of virtual engagements in higher education because of the coronavirus disease 2019 (COVID-19) pandemic has contributed to the expansion of international collaboration, which led to this increase. Another notable revelation is that despite the disruptions caused by the #RhodesMustFall and #FeesMustFall student protests in 2015 and 2016, South African academics and researchers continued to collaborate with their counterparts around the world. The given data suggests that the protests, disruptions and closure of many campuses for periods of time, particularly during 2016, did not have a negative effect on scholarly output through IRC.

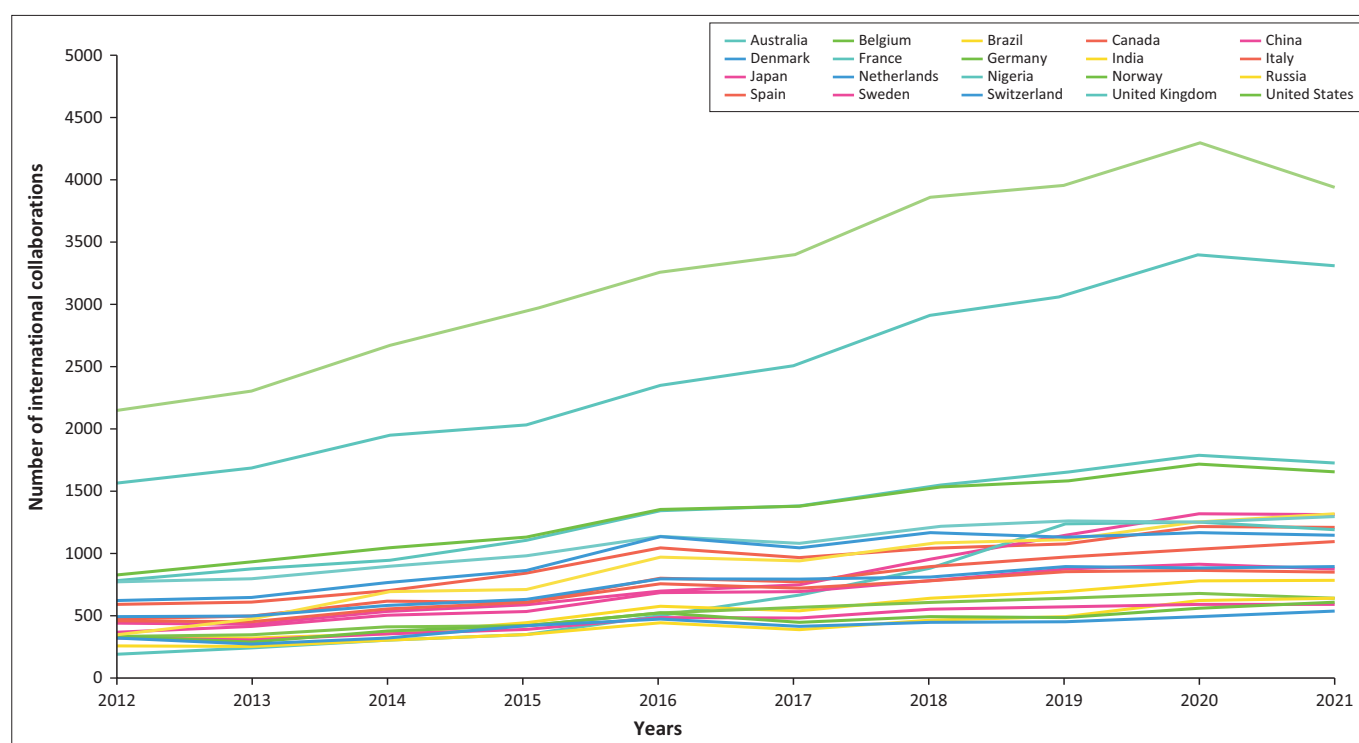
## Top collaborating countries for South African public higher education system, 2012–2021

In this section, the authors focus on the top 20 countries South African public universities have collaborated with on research output in the 2012–2021 period. Apart from the top 20 countries, the authors identify African countries in the top 100 countries that have collaborated with South Africa and also take a closer look at South Africa's IRC with BRICS countries.

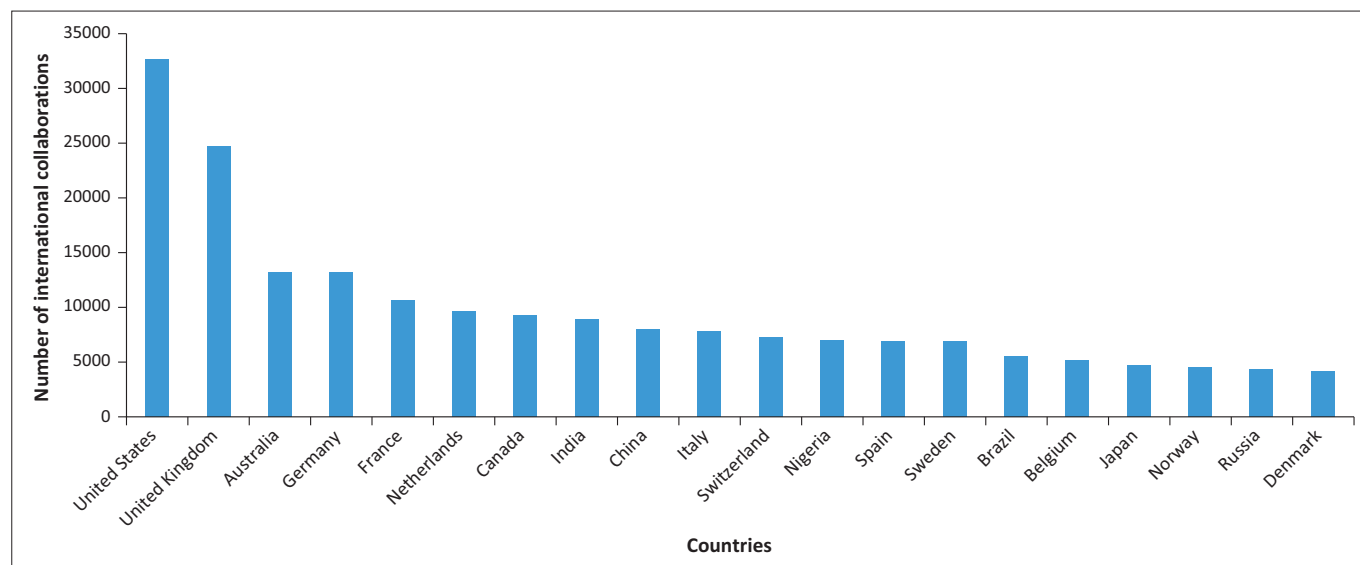
The Scopus data analysed in this study indicates that during the past decade, South African academics and researchers have collaborated with counterparts from 223 countries and territories around the world. This is a significant increase from 115 countries that South Africa collaborated with in 2005, as highlighted by Onyancha (2011). Figure 2 shows the annual trends for the top 20 countries that the South African public universities have collaborated with on co-authorship of academic publications in the 2012–2021 period. The annual growth in collaboration with the United States and the United Kingdom, and to a lesser extent with Australia and Germany, outstrips IRC growth with other countries. In South Africa's top 20 collaborating countries, there are 15 countries from the Global North. Nigeria is the only African country in South Africa's top 20 collaborators. Brazil, China, India and Russia, which make up the BRICS alliance together with South Africa, are also part of South Africa's top 20 international research collaborators for the past decade. When overall

**TABLE 1:** South African research output per year (2012–2021).

South Africa (2012–2021)	Overall	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Scholarly output	245 161	16 346	17 894	20 485	21 089	23 330	25 366	26 954	29 124	30 913	33 660
International collaboration (%)	48.1	42.4	43.6	42.8	45.6	46.8	47.7	48.8	49.6	51.7	54.1



**FIGURE 2:** South Africa's international research collaboration, 2012–2021. Top 20 countries.



**FIGURE 3:** Overall number of South Africa's international research collaborations with the top 20 countries, 2012–2021.

collaboration figures for this time period are taken into consideration, we get the picture as shown in Figure 3.

Like Figure 2, Figure 3 shows that South Africa's collaboration with the United States and the United Kingdom has dominated the country's overall international research collaboration during the 2012–2021 period. A study by Onyancha (2011) has explored the trends in South Africa's IRC between 1986 and 2005, highlighting that the top seven South Africa's collaborators during this period were the United States, the United Kingdom, Germany, Australia, Canada, France and the Netherlands. It is evident from Figure 3 that these collaboration trends and patterns have continued with very little change. The most important changes have taken place in terms of the expansion of collaboration with the BRICS countries. Between 1986 and 2005, only India and Brazil featured in South Africa's top 20 collaborators, in the 19th and 20th spot, respectively. In addition, during the 1986–2005 period, no African country was in South Africa's top 20 collaborators. The findings of this study show that Nigeria has emerged as one of South Africa's top collaborators, on 12th spot overall. Given South Africa's policy priorities and focus areas, which were previously discussed and which emphasise increasing IRC on the African continent and with the BRICS members, the authors unpack the intra-Africa and BRICS research collaboration in more detail.

Figure 4 shows the trends in South Africa's IRC with the African continent during 2012–2021, with countries that feature among South Africa's top 100 collaborating countries included. The most significant growth is evident in South Africa's collaboration with Nigeria. Another notable growth, albeit not on the same level, is IRC with Kenya. Collaboration with other African countries shows small annual growth in the past decade. As observed earlier, Onyancha's (2011) study of the patterns and trends in South Africa's IRC between 1986 and 2005 has shown that during this period, South Africa's top African collaborator was Zimbabwe at 24 spot, Namibia at 26, Kenya at 28, Nigeria at 33 and Botswana

at 39. When Onyancha's findings are compared with the data in Figure 4, it can be seen that in the last decade, collaboration with Nigeria has overshadowed IRC with other African countries. In addition, the collaboration with previously top African collaborators, such as Zimbabwe, Namibia and Botswana, has declined. Given South Africa's national strategic and policy priorities that put emphasis on expanding intra-Africa research collaboration, which were discussed earlier, interventions, projects and programmes that have led to significant expansion of research collaboration between South Africa and Nigeria will need to be replicated within the SADC region and elsewhere on the continent.

Figure 5 shows the trends in South Africa's IRC with the members of the BRICS grouping during the 2012–2021 period. It is evident that IRC with India and China has seen a steady growth, while the collaboration with Brazil and Russia has seen slower growth over the past decade. Given the strategic priority of South Africa's membership in BRICS, highlighted in various policy documents discussed earlier, this growth should not come as a surprise. However, it must be noted that, despite the strategic priority given to South Africa's BRICS membership, IRC with Brazil, China, India and Russia still lags behind many of South Africa's top collaborating countries from the Global North.

As highlighted in the introduction, in this article the authors are interested to see whether there have been any significant changes in South Africa's IRC trends and patterns since the #RhodesMustFall and #FeesMustFall student protests of 2015 and 2016. This was the time when the country's public universities experienced large-scale disruptions, protests and calls for dismantling of Eurocentric domination in higher education and decolonisation of knowledge. The findings presented here show that South African universities continue to prioritise IRC with the Global North. There are hardly any changes over the past two decades when it comes to South Africa's top seven collaborating countries, all of which are from the Global North. However, the findings show that IRC

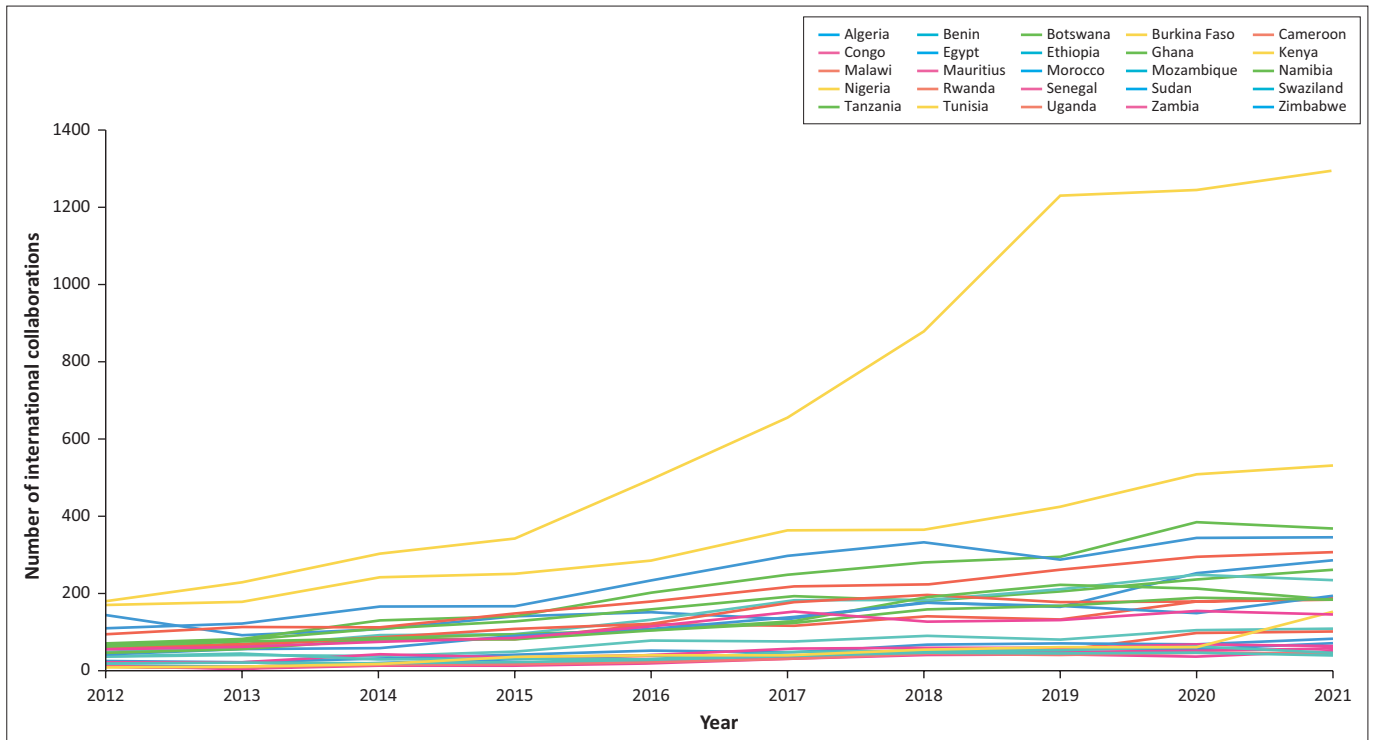


FIGURE 4: Trends in South Africa's international research collaboration with countries in Africa, 2012–2021.

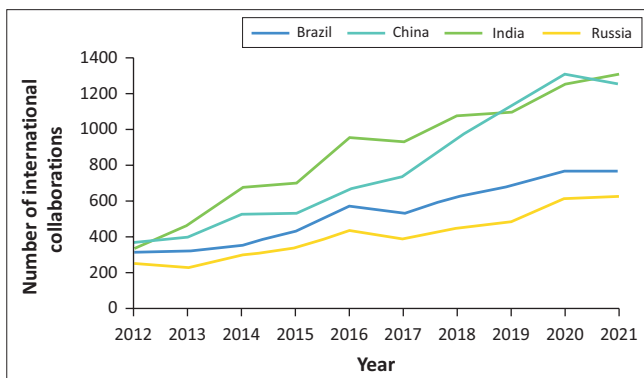


FIGURE 5: South Africa's international research collaboration with BRICS countries, 2012–2021.

with some countries in the Global South and some African countries has been expanding since 2015. In particular, Figure 4 highlights that collaboration with Nigeria began to take off and increase significantly since 2015. Collaboration with Kenya has also seen an increase since 2015. Similarly, Figure 5 shows increases in collaboration with BRICS countries since 2015. While the Scopus data does not provide any indication of the reasons for these increases, some improvements can be seen when it comes to collaboration with Nigeria, Kenya and BRICS countries since 2015. More research is needed to explore specific initiatives and projects that have driven these increases.

### Comparison of regional trends and patterns in South Africa's international research collaboration, 2012–2021

In this section, the authors analyse and compare trends and patterns in South Africa's IRC in terms of world regions and

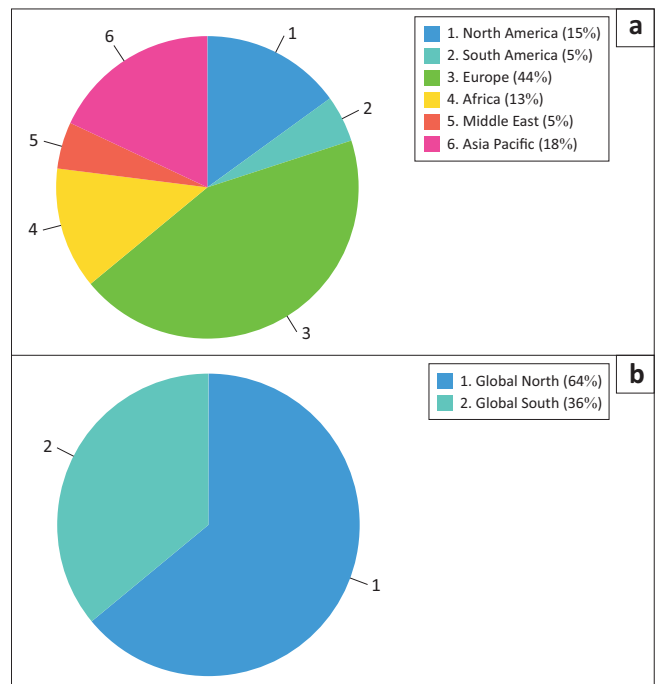
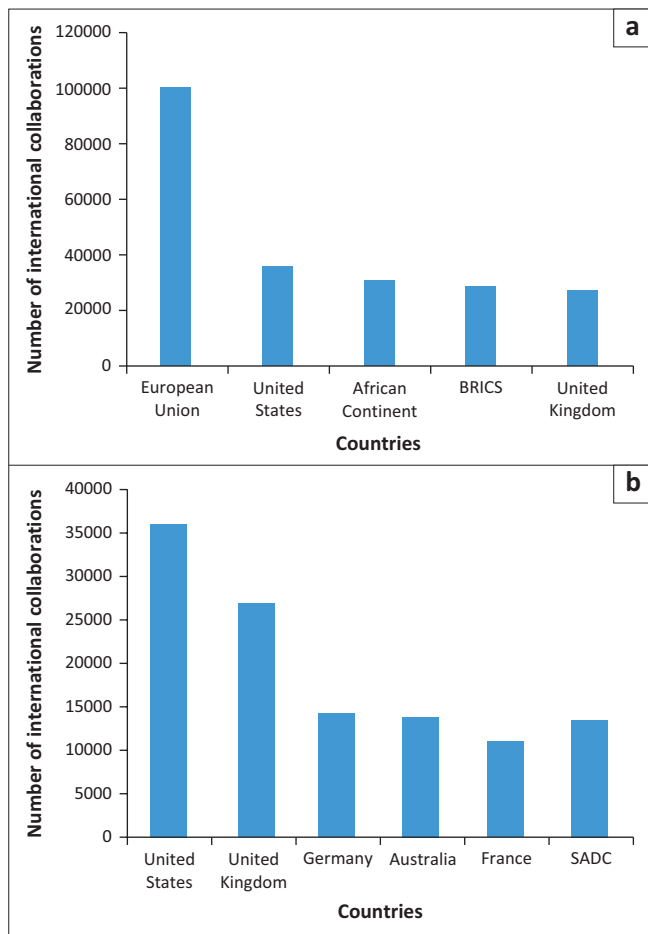


FIGURE 6: South Africa's international research collaboration, 2012–2021 by regions (a) and by global breakdown (b).

groupings. This includes the global research collaboration breakdown, a comparison between the Global North and Global South, and select comparisons between different countries, regions and groupings.

The first graph in Figure 6 presents the global breakdown of South Africa's IRC during the past decade. Europe is South Africa's largest collaborator, at 44% of all research collaboration, followed by Asia Pacific at 18% and North





BRICS, Brazil, Russia, India, China and South Africa; SADC, Southern African Development Community.

**FIGURE 7:** South Africa's international research collaboration, 2012–2021 – select comparisons.

America at 15%. The collaboration with the African continent stands at 13% of South Africa's IRC for the 2012–2021 period. The Middle East and South America both stand at 5%. The second graph presents a breakdown of South Africa's IRC between the Global North and South. In this paper, the term Global North refers to the United States, Canada, Australia, New Zealand, the United Kingdom, European Union, Israel, Japan, South Korea and Taiwan. The term Global South refers to the rest of the world. According to Dados and Connell (2012), the Global North–South division is about the historical and contemporary socio-economic, political and ideological divides, with particular emphasis on power and geopolitical dynamics rooted in colonialism and maintained through neocolonialism and coloniality. The collaboration with the Global North continues to dominate South Africa's IRC and knowledge production, at 64%. However, when compared with Onyancha's (2011) finding about South Africa's IRC during the 1986–2005 period, when the country's co-authorship of scholarly research output with the United States, England and Germany alone amounted to 66% of all IRC by South African universities, it can be seen that the country has made small improvements in expanding research collaboration and co-authorship of scholarly output with countries outside the Global North.

The first graph in Figure 7 presents a comparison between South Africa's IRC with the European Union as a whole, the United States, the United Kingdom, the African continent as a whole, and the BRICS countries. It is evident that the collaboration with the European Union dominates South Africa's IRC. South African public universities also collaborate more with the United States than the entire African continent, as well as the entire BRICS grouping. The second graph shows the comparison of the top five South Africa's collaborating countries, all of which are from the Global North, and the 15 members of the SADC. Despite the close proximity of the SADC region and numerous policy and strategic documents that have called for the expansion of IRC between South Africa and other SADC members, it is evident that this has been neglected and sidelined by the South African public higher education sector over the past decade.

## Conclusion

In this article, the authors have unpacked the past decade of South Africa's international research collaboration. Using the Scopus bibliometric data and the SciVal analytics platform, the authors have explored the IRC between South African academics and researchers working at the country's public universities and their international counterparts. The focus was on the: (1) examination of South African knowledge production trends and patterns between 2012 and 2021, (2) identification of top countries the public higher education sector collaborated with on co-authorship of academic publications, (3) examination of annual collaboration trends, and (4) examination of trends and patterns in South Africa's international co-authorship of academic publications in terms of world regions and groupings.

The findings of this study highlight a significant growth in the number of countries South African public universities have collaborated with over the past two decades, from 115 countries in 2005 (Onyancha 2011) to 223 countries and territories over the past decade. The authors have also shown that IRC continues to grow. In 2012, IRC accounted for 42.4% of South Africa's overall research output; in 2021, this figure stood at 54.1%. When it comes to the top 20 countries collaborating on knowledge production with South Africa, countries from the Global North dominate the collaboration space, with the United States and the United Kingdom leading the collaborations. The only African country in the top 20 is Nigeria. Brazil, China, India, and Russia are the only other countries from the Global South in South Africa's top 20 collaborators for the 2012–2021 period. The analysis of the Scopus data has also shown that the collaboration between South African public universities and their counterparts in the Global North constitutes 64% of all co-authored scholarly output during the past decade. Similarly, the comparisons of different regions and groupings have shown that South Africa's collaboration with the European Union far outstrips the collaboration with the African continent or the BRICS countries. Similar findings were presented in comparisons between different parts of the Global North, the African continent and the SADC region. These trends are a

continuation of the 1986–2005 trends highlighted by Onyancha (2011) and indicate that the South African public higher education sector continues to prioritise engagement and collaboration with the Global North while largely neglecting the African continent and the rest of the Global South. However, it is important to note that the past decade has seen a steady growth of IRC with Nigeria and the BRICS countries.

A comprehensive analysis of South Africa's research collaboration trends and patterns with countries around the world is important for a better understanding of higher education's IRC footprint. It is also important for understanding which parts of the world should be prioritised by universities in the expansion of research collaboration in the future. South African public universities have a responsibility to contribute to the country's transformation from centuries of colonial oppression and decades of apartheid rule, segregation and racism. One way they can contribute to transformation is through epistemic decolonisation, which includes the expansion and strengthening of academic and research links with the African continent and the rest of the Global South and collaboration with these parts of the world on knowledge creation. Stronger links between African academics, researchers and institutions, in particular, would contribute to promotion of research priorities, collaborative projects and development of new knowledge that are relevant for the African continent and its people (Onyancha 2021).

While this has been a policy priority in the country since the end of apartheid, this study shows that, even though there are some positive developments, there is still a long way to go for South African public universities to expand and strengthen intra-Africa and South–South international research collaboration. The findings confirm the arguments raised by numerous scholars (Canham 2018; Heleta 2018; Mbembe 2016; Maringe & Ojo 2017; Modiri 2021) that the South African academia continues to be largely Eurocentric and focused on engagements and collaboration with the Global North, while sidelining and neglecting the rest of the African continent and much of the Global South. There is a need to move from the rhetoric about the importance of intra-Africa and South–South collaboration in higher education and research and deliver on these policy recommendations and strategic priorities (Heleta 2022). The DHET needs to track and analyse national and institutional IRC trends and patterns in its annual research output reports, which has not been the case until now (see e.g. DHET 2021). Based on this analysis, DHET can provide incentives and support to universities for expanding and strengthening partnerships and IRC with the African continent and Global South.

Future research should focus on exploring specific initiatives, interventions and projects that have driven the increase in collaboration between South African universities and universities in Nigeria, Kenya and BRICS countries over the past decade. Research is also needed on whether donor funding for research impacts the choice of collaborating countries and institutions. There is a need for qualitative

research on the types, nature and dynamics of international research collaboration involving South African and other scholars. Other qualitative research could also explore the reasons for continued prioritisation of IRC with the Global North by South African scholars and public universities. It would be important to explore whether the internationalisation of higher education, as conceptualised and practiced in South Africa since 1994, has contributed to prioritisation of collaboration with the Global North while neglecting intra-Africa and South–South collaboration. Additional research is needed to unpack South Africa's IRC trends and patterns in different academic disciplines, with possible inclusion of citation data in the analysis. Future research should also explore South Africa's IRC trends and patterns using other bibliometric databases and in particular try to include bibliometric data that is not indexed by Scopus. Finally, it would be valuable to explore and compare institutional IRC trends and patterns in South African public higher education over the past decade.

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### Data availability

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