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# **BUILDING PhD CAPACITY IN SUB-SAHARAN AFRICA**

International  
**Higher Education**

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# Acknowledgments

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Helmut Blumbach from the DAAD and Michael Peak from the British Council drove the study forward.

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# Foreword

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Higher education can play a crucial role in the economic and social development of a country, and is often a natural mechanism with which to develop international relations. Consequently, the British Council and the German Academic Exchange Service (DAAD) have been working in Sub-Saharan Africa for many decades.

The British Council and DAAD hold many shared values and inspirations, and we also have a strong history of collaboration – working together on programmes and projects, as well as jointly funded research studies.

With this experience, and with these values in mind, we undertook to investigate further the nature of research and doctoral training across Sub-Saharan Africa. What are the relationships between national-level policy and institutional-level agenda; and how are institution links with business and industry developing? What progress is being made, and what challenges exist with regard to growing quality PhD provision in countries so rich in natural resource and talented youth?

Our intention with this study was to shed light on this area and provide evidence to support higher education

and PhD training in Sub-Saharan Africa. The aim was to support decision making around national-level policy, and institutional-level practice, and to provide current and potential international partners with insight into the PhD environment in the six studied countries across the region (Ethiopia, Ghana, Kenya, Nigeria, Senegal, South Africa).

When we initiated this study we knew that we had tapped an area of intense interest as the competitive tender process that we ran attracted a high degree of interest and received several quality proposals.

Fundamental to our intentions when commissioning this study was the importance of collaborating with locally based researchers, and representatives of HE institutions in the region, and this was behind our thinking when we chose to work with the African Network for Internationalization of Education (ANIE) to conduct the underlying empirical research.

To complement the research of ANIE, this study has also drawn on the skills of experts at University College London (UCL) Institute of Education: overall this has been a truly collaborative international research project.

In itself, the process of this study revealed in some ways a hint of the challenges which can face active social science researchers in the region (such as access to interviewees and survey respondents; connectivity; access to data sources; etc.)

Of course, collaborative working can also present challenges, and conducting a multi-country study such as this was not always plain sailing. But the local expertise and insight of individual researchers, the communal strength of the ANIE network, and interpretive and editorial skills of colleagues at UCL Institute of Education ensured that the final research outputs are insightful and of a high quality.

We hope that you agree, and that this study contributes to an evidence base to support PhD training and capacity building in Sub-Saharan Africa.

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# Introduction

Higher education is widely recognised as being central to development, contributing not only to enhancing individual opportunities in life, but also to a vibrant democracy, innovative economy and a range of other societal benefits in areas such as health, nutrition, governance and environmental protection.<sup>1</sup> The development of higher education (HE) systems is particularly critical in a region like Africa, given the significant youth bulge, the need for innovation to create new forms of employment, and the potential of research to address the significant social and environmental challenges.

Nevertheless, despite strong endorsement of HE on the part of governments and international agencies, and buoyant demand from populations for furthering their studies, there are significant barriers to expansion. Shortages of academic staff mean that even when funding is in place, expansion of systems leads to significant strain on resources, very large class sizes and quality challenges. Doctoral education has often been viewed as a lower priority – given the need to attend first to the undergraduate level – but this approach underestimates the significant interdependence between these levels. Adequate staffing for the undergraduate level, and a thriving and innovative research environment, to a large extent

depend on the possibilities of high quality *doctoral* study.<sup>2</sup>

Globally, PhD training has received particular currency in HE policy circles as a response to the broader economic context of the ‘knowledge society’, ‘knowledge economy’ or ‘talentism’.<sup>3</sup> It is commonly acknowledged that the role of researchers is essential in driving scientific output and innovation. A sign of the growing importance of PhD-trained researchers is the inclusion of not only tertiary graduate figures but specifically doctoral graduate figures in innovation indicators, such as the Innovation Union Scoreboard (IUS)<sup>4</sup> used by the European Union (EU).

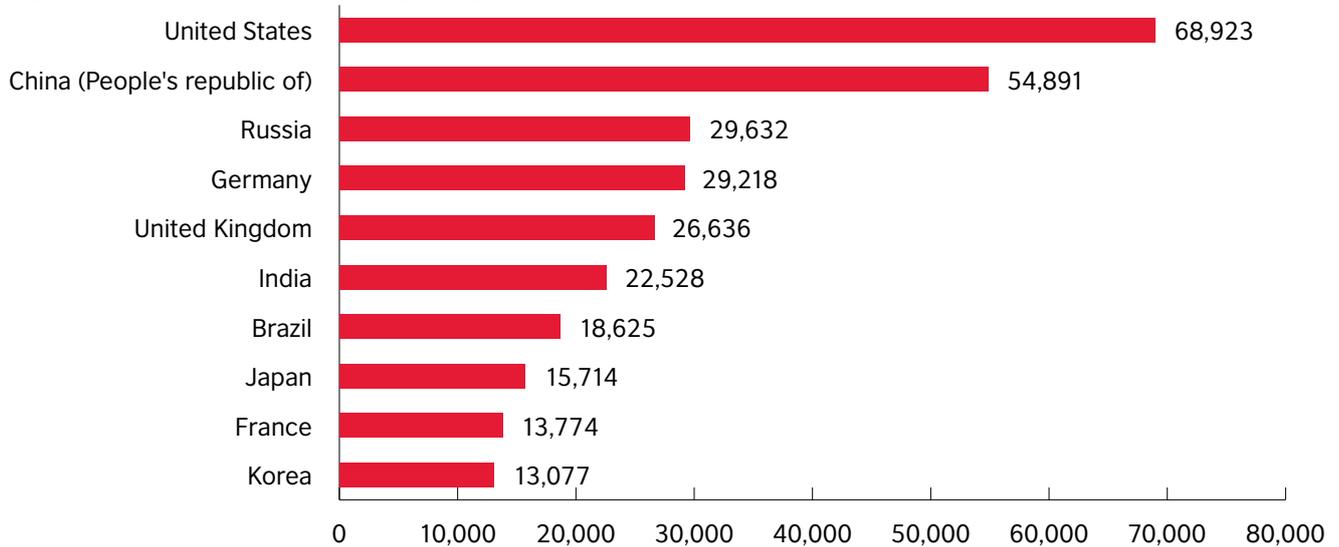
While the argument around quality of undergraduate education is widely accepted, the link between PhD provision and knowledge sector jobs and innovation has been the subject of some debate. Some scholars maintain that policymakers should be cautious of the assumed PhD-high skills jobs alignment, and instead consider all options (including vocational education) for producing graduates with relevant competencies.<sup>5</sup> From the perspective of industry itself, the number of PhD graduates may be less important for innovation than contextual factors. For example the Global Innovation Index (GII), unlike the UIS used by the EU, does not include PhD graduates

as a measure, and instead places emphasis on political, regulatory and business environment.<sup>6</sup> Indeed in the OECD context, some economists have even raised concerns about an oversupply of PhD graduates.<sup>7</sup>

Beyond the OECD context, the mood is quite different. In many countries, there is a severe lack of opportunities for obtaining higher degrees even among university staff: the 2009 *Trends in Global Higher Education* study<sup>8</sup> estimated that as many as half of those teaching in universities across the world had no more than an undergraduate degree. Governments are consequently investing significant funds into PhD expansion schemes. China, India and Brazil have all made significant gains in PhD graduations. As can be seen in Figure 1, they are among the world’s leading producers of PhD graduates. PhD students from countries where doctoral training has traditionally been undertaken abroad can increasingly rely on domestic PhD provision rather than studying overseas. Nevertheless, socio-cultural factors still drive students to study abroad, which means that expansion in domestic PhD provision must compete with the attractive overseas option. In Latin America, governments have addressed this concern by investing in both domestic provision and overseas

1. Boni, A, Lopez-Fogues, A, Walker, M (2016) Higher education and the post-2015 agenda: a contribution from the human development approach. *Global Ethics* 12/1: 17–28; McCowan, T (2016) Universities and the post-2015 development agenda: an analytical framework. *Higher Education* 72/4: 505–525; Oketch, M, McCowan, T and Schendel, R (2014) *The Impact of Tertiary Education on Development: A Rigorous Literature Review*. London: Department for International Development.
2. Morgan J (2011) The rise and rise of PhDs as standard. *Times Higher Education*. Available online at: [www.timeshighereducation.co.uk/415203.article](http://www.timeshighereducation.co.uk/415203.article), cited in Cloete, N, Mouton, J and Sheppard, C (2015) *Doctoral education in South Africa*.
3. Cloete, N, Mouton, J and Sheppard, C (2015) *Doctoral education in South Africa*. Cape Town: African Minds. Available online at: [www.idea-phd.net/images/Doctoral-Education-in-South-Africa-WEB-3.pdf](http://www.idea-phd.net/images/Doctoral-Education-in-South-Africa-WEB-3.pdf)
4. ‘New doctorate graduates’ and ‘Population aged 30–34 with tertiary education’ are measures of Human Resources, a sub-index nested under the ‘Enablers’ index. Eurostat (2016). *Glossary: Innovation union scoreboard (IUS)*. Eurostat Statistics Explained. Available online at: [http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Innovation\\_union\\_scoreboard\\_\(IUS\)](http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Innovation_union_scoreboard_(IUS))
5. Gokhberg L, Shmatko N, Auriol, L (2016) ‘Rethinking the Doctoral Degrees in the Changing Labor Market Context’, in Gokhberg L, Shmatko N, Auriol, L (eds) *The Science and Technology Labor Force*. Science, Technology and Innovation Studies. Cham; Springer.
6. Cornell, INSEAD and WIPO (2017) *GII Framework. The Global Innovation Index*. Available online at: <https://www.globalinnovationindex.org/about-gii>
7. Cyranoski D, Gilbert, N, Ledford, H, Nayar, A and Yahia, M (2011) Education: The PhD factory. The world is producing more PhDs than ever before. *Is it time to stop?* *Nature* 472: 276–279.
8. Altbach, PG, Reisberg, L, Rumbley, LE (2009) *Trends in Global Higher Education. Tracking an Academic Revolution*. Paris: UNESCO.

**Figure 1:** Top ten countries producing PhD graduates, 2015\*



Source: OECD (2018). Education indicators - Graduates by field, Doctoral or equivalent level (ISCED2011 level 8), for the year 2015

\*Ranked on a list comprising the 34 OECD member states excluding Greece and the Netherlands (for whom data was not available), and eight other non-OECD countries where data was available: Brazil, People's Republic of China, Colombia, Costa Rica, India, Indonesia, Lithuania and Russia.

provision via state-funded PhD scholarships. Because the overseas PhD study in this case is supported by the state, governments are able to stipulate conditions of return, ensuring that the overseas-trained PhD graduates join the national pool.<sup>9</sup>

Currently, there is a 'shared optimism' in Sub-Saharan Africa (SSA) on the value of building PhD capacity, as exemplified in formal declarations such as the Kigali Communique (2014) or the Dakar Declaration on the revitalisation of African higher education (2015).<sup>10</sup> In terms of our empirical understanding of the PhD landscape in SSA, two key studies have informed the policy discourse, namely the International Association of Universities (IAU) and

the Catalan Association of Public Universities (ACUP) joint report summarising the outcomes of a 2012 international seminar,<sup>11</sup> and a report by the Higher Education Research and Advocacy Network in Africa (HERANA) from 2014.<sup>12</sup> These reports have highlighted low or inconsistent PhD capacity despite significant expansion in master's level graduations – an issue related to funding and supervisory capacity. The former report also highlighted a lack of evaluative mechanisms to assess the quality and socio-economic relevance of PhD outputs.

While the above reports provide helpful context to the PhD training landscape in SSA, they draw on institutional data

from a selection of six to eight flagship institutions, rather than a comparison of national-level data on PhD provision. Therefore, there is an urgent need to contribute to the evidence base on PhD provision using national-level data, and to take into account doctoral training provision in a cross-section of diverse institution types. Given the concerns about quality and socio-economic relevance, there is also a need to assess the format and conditions of provision, and to explore patterns of engagement on the part of doctoral education providers with industry, the private sector, the community and policymakers. This study is informed by a need to address these gaps.

9. Balan, J (2008) Graduate Education in Latin America: The Coming of Age. *International Higher Education* 50: 9–11. Available online at: <https://doi.org/10.6017/ihe.2008.50.8002>

10. Molla, T and Cuthbert, D (2016) In pursuit of the African PhD: A critical survey of emergent policy issues in select Sub-Saharan African nations, Ethiopia, Ghana and South Africa. *Policy Futures in Education* 14/6: 635–654.

11. IAU-ACUP (International Association of Universities and the Catalan Association of Public Universities) (2012) International seminar on innovative approaches to doctoral education and research training in sub-Saharan Africa: Report. Available online at: [www.iau-aiu.net/sites/all/files/Final\\_Report\\_IAU\\_ACUP\\_Seminar\\_on\\_innovative\\_approaches\\_to\\_doctoral\\_education.pdf](http://www.iau-aiu.net/sites/all/files/Final_Report_IAU_ACUP_Seminar_on_innovative_approaches_to_doctoral_education.pdf)

12. Bunting I, Cloete N and Van Schalkwyk, F (2014) *An Empirical Overview of Eight Flagship Universities in Africa: 2001–2011*. A report of the Higher Education Research and Advocacy Network in Africa (HERANA). Cape Town: Centre for Higher Education Transformation (CHET).

# Research aims and methods

This report provides an overview of a study commissioned by the British Council and the German Academic Exchange Service (DAAD) that surveyed research and doctoral training capacity in Ethiopia, Ghana, Kenya, Nigeria, Senegal and South Africa. The aims of the study were to investigate:

- i. the availability, quality and thematic priorities of PhD programmes and how they have changed over the last ten years
- ii. the national level research agenda
- iii. the extent to which research training at institutional level is aligned with the national agenda
- iv. national-level systems (policies, legislation) that enable alignment between institutional level research training with the national agenda
- v. how institutional priorities reflect the needs of universities and emerging research and development systems, including local industry and societal needs
- vi. funding sources to develop and sustain PhD provision
- vii. the role of international collaboration in building PhD capacity.

The British Council and DAAD partnered with the African Network for Internationalization of Education (ANIE) to undertake empirical research to investigate these questions in the six case study countries. Each country report was prepared by a team of locally-based researchers familiar with the particular challenges and opportunities related to PhD provision of their country context. The teams followed a similar overall methodological approach, (albeit with some variation due to contextual and circumstantial considerations). The resulting six

country studies<sup>13</sup> report their empirical findings based on policy analysis and the most recent national and institutional data available on PhD provision. Data was also collected via questionnaires and interviews with a range of stakeholders comprising representatives of national agencies responsible for building research capacity, representatives of industry, and university staff and students from a diverse sample of institutions. The country reports also include expanded discussion of the national level context and policies for research training.

This report synthesises the key findings from the six country studies with a view to contributing to the comparative evidence base on PhD provision in Sub-Saharan Africa, bearing in mind the need for future programme and policy design. In particular, the study was informed by the need to identify whether higher education expansion in the region has led to enhanced research capacity and quality of teaching in a manner that has potential to support sustainable development objectives for national governments.<sup>14</sup> This report highlights the key findings related specifically to PhD provision and draws out implications for policy at national and international levels.

In the following three sections we provide some context for the research and doctoral training landscape in SSA. First we provide a general profile of each of the six countries (population, gross national income [GNI] per capita, size of HE system). Although the primary focus of this report is on doctoral provision, we also include a brief overview of research production in the region first. This is in line with the broader aims of the study to produce a more holistic and relational picture

of PhD production, one that is embedded in the research training landscape more generally. Against this backdrop, we then highlight data on PhD provision (enrolments, graduations, number of programmes) at a national level, alongside key policy frameworks, policy actors, or targets related to PhD provision.

The research findings section synthesises key insights from the country-level studies, informed by the empirical data collected for these studies (desk review of policies and regulations, and questionnaire and interview data with a range of HE stakeholders). Due to different contextual circumstances, slightly different sampling approaches were used in each country study. Accordingly, we do not report on summary statistics of questionnaire data here, but rather we invite readers to turn to the country reports for detailed analysis of this data. The final section draws out conclusions and recommendations for future policy and research. The implications of relying on a primarily self-funded student body for PhD graduation trends is highlighted, including low completion rates and high dropouts; inequities in terms of gender, race and historically advantaged institutions; and limited opportunities for alignment or engagement with industry, the private sector and societal needs. In addition, we highlight the need for further research clarifying the interplay between domestic and overseas (including African) PhD provision. This is particularly important in terms of post-PhD employment trajectories, and their implications for enhancing the quality of higher education and research and development systems in the region.

13. Individual reports detailing the research findings for each country in this study are available at: [www.britishcouncil.org/education/ihe](http://www.britishcouncil.org/education/ihe) and also at <https://www.daad.de/download/phd201806>

14. Mohamedbhai, G (2014) *Focus on research for development, not academic rankings*. SciDevNet. [www.scidevnet.com](http://www.scidevnet.com) Available online at: [www.scidev.net/global/education/opinion/research-development-academic-rankings.html](http://www.scidev.net/global/education/opinion/research-development-academic-rankings.html)

# Country profiles

**Figure 2:** Country profiles

Ethiopia	
Population (millions)	101.9
Gross national income per capita (GNI)	\$1,620
Gross tertiary enrolment ratio (GTER)	8.13% (2014)
Higher education sector	
40 universities (36 public, 4 private)	
100 other private higher education institutions	

Ghana	
Population (millions)	28.03
Gross national income per capita (GNI)	\$4,070
Gross tertiary enrolment ratio (GTER)	16.23% (2015)
Higher education sector	
171 higher education institutions	
14 universities (10 public, 4 private chartered)	
72 private university colleges; 10 polytechnics; 1 distance learning institution; 45 colleges of education; 29 nurse training colleges	

Kenya	
Population (millions)	47.25
Gross national income per capita (GNI)	\$3,060
Gross tertiary enrolment ratio (GTER)	4.05% (2009)
Higher education sector	
40 chartered universities (23 public, 17 private)	
15 constituent colleges (10 public, 5 private)	
15 universities with Letter of Interim Authority (LIA)	

Nigeria	
Population (millions)	186.99
Gross national income per capita (GNI)	\$5,800
Gross tertiary enrolment ratio (GTER)	10.07% (2011)
Higher education sector	
503 higher education institutions	
153 universities (40 federal universities, 44 state, 69 private)	
84 polytechnics; 27 monotechnics 36 colleges of architecture; 50 colleges of health and technology; 84 colleges of education 69 vocational institutes	

Senegal	
Population (millions)	15.59
Gross national income per capita (GNI)	\$2,390
Gross tertiary enrolment ratio (GTER)	10.39% (2015)
Higher education sector	
5 public universities	
75 private institutions, mostly comprising management schools	

South Africa	
Population (millions)	54.98
Gross national income per capita (GNI)	\$12,830
Gross tertiary enrolment ratio (GTER)	19.38% (2014)
Higher education sector	
26 public institutions	
11 universities	
6 comprehensive universities	
9 universities of technology	

Population: UIS (2018). Total population. Data for 2016. Rounded up to nearest ten thousand. Data for 2016.

GNI per capita: UIS (2018). GNI per capita, PPP (current international \$). Data for 2015.

GTER: UIS (2018). Gross enrolment ratio, tertiary, both sexes (%).

# The context of research production

Sub-Saharan Africa's (SSA) share of the global output in research papers is minor but growing. It increased from 0.44 per cent in 2003 to 0.72 per cent in 2012.<sup>15</sup> In terms of citation impact, the region's share of global citations also grew, doubling from 0.06 per cent in 2003 to 0.12 per cent in 2012. Field-weighted citation impacts (FWCI) were higher than 1 throughout the region (except in West and Central Africa), meaning that these articles were cited more than the world average expected for the subject and type of publication.<sup>16</sup>

Globally, research output is dominated by natural science subjects,<sup>17</sup> and the same is the case for SSA. Health sciences form the largest share in almost all sub-regions, with only South Africa as the exception. Social sciences (including arts and humanities) and life sciences occupied the smallest share of SSA's research output, although social science is the fastest growing group.<sup>18</sup> A detailed breakdown of the subject groupings for 2012, as well as changes over the decade 2003–12 are provided in Table 1 and Table 2. In terms of

co-authorship and inter-connectedness of science researchers, it has been established that international collaboration accounts for most of the research output, consistently over 60 per cent in East Africa and Southern Africa.<sup>19</sup> Intra-regional collaboration (i.e. between researchers of two African countries) accounted for a minor portion of research output (below 15 per cent),<sup>20</sup> and was even lower when no OECD country co-author was involved in the collaboration.<sup>21</sup> This suggests that regional HE hubs and research centres are yet to maximise their full potential in creating networked communities of African academics.

SSA's modest growth in research output and improvement in citation impact outlined above has occurred against a backdrop of human and material resource challenges. The world average of researchers per million inhabitants in 2014 stood at 1,098.4. In SSA, the figure was only 87.8, compared to 166.5 in South and West Asia, and 434.9 in Latin America and the Caribbean.<sup>22</sup> GDP expenditure

on research and development in the region is far below the world average of 1.68 per cent. In 2014 the figure was 0.41 per cent for Sub-Saharan Africa, compared to 0.79 per cent for Latin America and the Caribbean, and 0.72 per cent for South and West Asia.<sup>23</sup> Comparable data for the six countries included in this study are shown in Figure 3. Overall, South Africa, Senegal and Kenya have comparatively higher material and human resources invested in the national research infrastructure. In each country, the government bears the major share of research and development expenditure, in fact almost exclusively so in Nigeria. South Africa has a comparatively high proportion funded by the business sector, and Kenya via the HE sector. Kenya and Senegal additionally rely heavily on foreign sources for their research and development spending.<sup>24</sup>

15. Elsevier and World Bank (2014) *A Decade of Development in Sub-Saharan African Science, Technology, Engineering and Mathematics Research*. [Working Paper No 91016]. Available online at: <http://documents.worldbank.org/curated/en/237371468204551128/pdf/910160WP0P126900disclose09026020140.pdf>.

16. Elsevier and World Bank, *op. cit.* P. 19.

17. For example, 69 per cent of titles (not articles) in SCOPUS are in science, comprising 27 per cent physical sciences, 26 per cent health sciences, and 17 per cent life sciences. In contrast, social science titles (including arts and humanities) comprise about a third (31 per cent) of subject coverage. Elsevier (2018). Scopus Content Coverage Guide [Updated August 2017]. Available online at: <https://www.elsevier.com/solutions/scopus/content>

18. Elsevier and World Bank, *op. cit.*, page 18.

19. Elsevier and World Bank, *op. cit.*, page 36.

20. Elsevier and World Bank, *op. cit.*, page 40.

21. Elsevier and World Bank, *op. cit.*, page 39.

22. UNESCO Institute for Statistics (2015) *Researchers per million inhabitants (FTE)*, 2014.

23. UNESCO Institute for Statistics (2017) *GERD as a percentage of GDP*, 2014.

24. UNESCO Institute of Statistics (2015) GERD percentage by source of funds. The sources comprise: higher education, government, business, private non-profit, rest of the world (abroad) and not specified.

**Table 1:** Percentage of total article output by subject groupings for Africa regions 2012

Subject grouping*	East Africa	West and Central Africa	Southern Africa	South Africa
Health sciences	47.8%	43.1%	44.8%	26.5%
Physical sciences and STEM	25.3%	32.3%	28.0%	44.7%
Agriculture	34.0%	28.2%	33.4%	22.9%
Social sciences and humanities	15.4%	14.0%	17.5%	21.8%
Life sciences	15.0%	15.2%	15.7%	8.7%

Source: Scopus 2003–12, reproduced in Elsevier and World Bank (2014).

\*Columns do not add up to 100 per cent as cross-disciplinary articles are counted multiple times. Subject groupings were defined by All Science Journal Classification (ASJC) subject areas. Articles that matched more than one ASJC category were counted once in each relevant category. For example, an article on the impact of increased corn production on pricing is counted once in the 'agricultural and biological sciences' grouping and once in the 'economics, econometrics and finance' grouping. See Elsevier and World Bank (2014) A decade of development, Appendix C for a detailed explanation of the methodology.

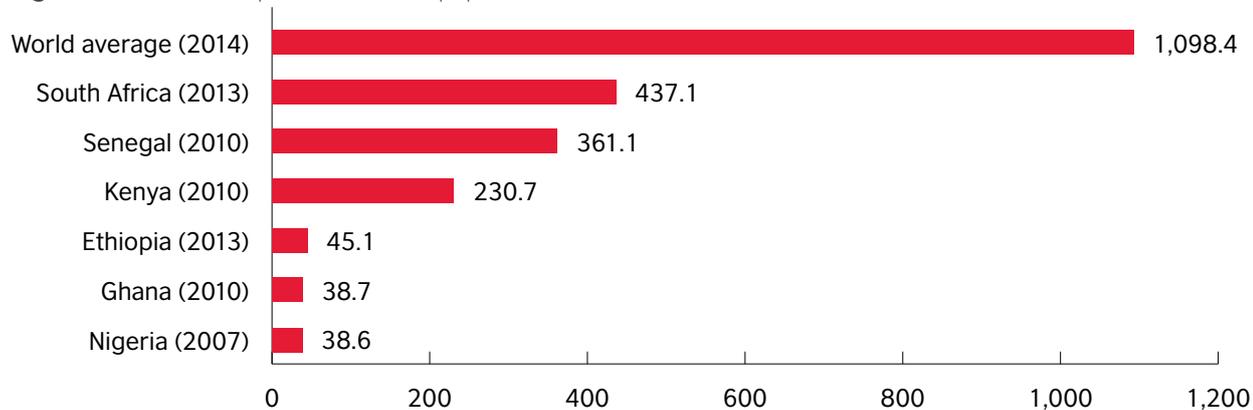
**Table 2:** Changes in percentage of total article output by subject groupings for Africa regions 2003–12

Subject grouping*	East Africa	West and Central Africa	Southern Africa	South Africa	SSA average
Health sciences	4.1%	3.2%	4.5%	2.8%	3.7%
Physical sciences and STEM	-0.4%	1.4%	-1.7%	-0.1%	-0.2%
Agriculture	-2.6%	-1.7%	0.2%	-3.7%	-2.0%
Social sciences and humanities	4.4%	5.1%	3.6%	3.4%	4.1%
Life sciences	-4.7%	-3.7%	-2.6%	-0.9%	-3.0%

Source: Scopus 2003–12, reproduced in Elsevier and World Bank (2014) A decade of development.

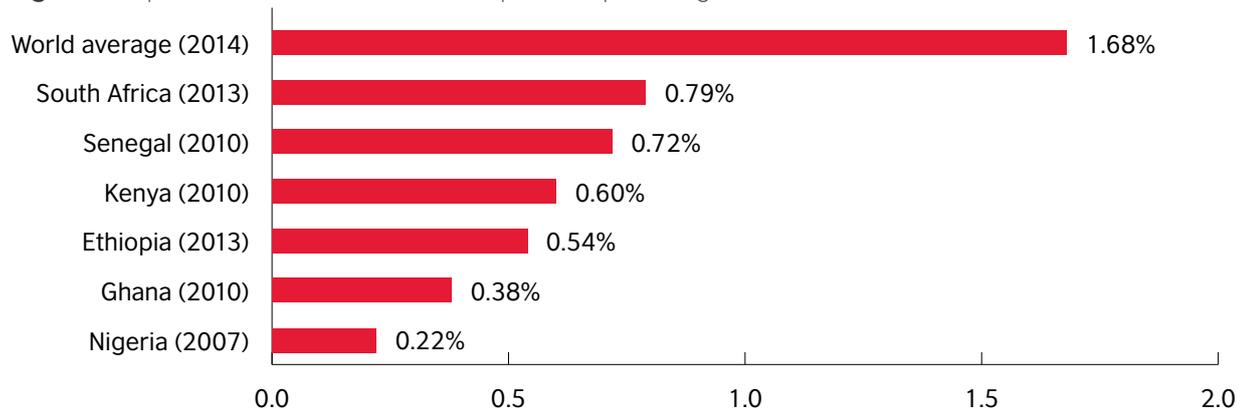
\*Subject groupings were defined by All Science Journal Classification (ASJC) subject areas. Articles that matched more than one category were counted once in each relevant category. Therefore, totals do not add up to 100 per cent.

**Figure 3:** Researchers per million of the population



Source: UNESCO Institute of Statistics (2015) Researchers per million inhabitants (FTE). The most recent data available is provided for each country. The research and development survey includes HE staff as researchers. The full-time equivalent (FTE) statistic excludes time that researchers may spend on other tasks, such as teaching and administration, whereas the head count figure simply tallies up all research personnel who conduct research. Therefore, the FTE statistic is usually used for comparison purposes as it provides a more accurate indication of actual research capacity.

**Figure 4:** Expenditure on research and development as percentage of GDP



Source: UNESCO Institute of Statistics (2015) GERD per cent (by source of funds). The most recent data available is provided for each country.



# The context of PhD training

Although direct country comparisons are not always possible due to variation in availability of data, Figure 5 highlights key statistics, policy frameworks/actors and national targets related to PhD capacity for each of the six countries included in the study. As can be seen, each country has witnessed some kind of recent change in the policy environment surrounding economic development and research, with potential to impact PhD provision. This may be in terms of the setting of explicit targets for PhD graduates, or the setting up

of new bodies to manage and fund research (including PhD provision), or more generally in terms of economic policy frameworks providing a mandate for investment in research capacity. Overall, the number of PhD programmes/enrolments has grown substantially in each country over the last ten years, the most striking example being Ethiopia. In 2006 there were only three PhD programmes in two subject areas, whereas in 2015 this had grown to 138 programmes in six subject areas.<sup>25</sup> In part, the expansion in PhD provision

reflects growth in the national HE systems in general, at undergraduate and master's levels as well. As is the case in most countries, PhD enrolments as a proportion of the overall student population are relatively low: below two per cent in Ghana, Kenya and South Africa, and slightly higher at 7.8 per cent in Ethiopia. However, a shortage of PhD-qualified staff in universities was a salient feature in each of the countries, with their proportion of the overall staff ranging from eight per cent to 43 per cent.<sup>26</sup>

**Figure 5:** PhD provision: key statistics and policies

<b>Ethiopia</b>	<b>Key policy frameworks, targets and actors</b>	% of HE staff with PhD qualifications (2016)	8%
		Expatriate proportion of PhD-qualified faculty	26%
	70:30 graduate mix: 70% target in favour of science and technology subjects. <i>(Ministry of Education 2008)</i>	Number of PhD programmes (2015)	138
		Number of PhD enrolments (2015)	3,135
	Directive on linkages between education and training, research institutions and industry: addresses recent industrialisation strategy and prior lack of HE-industry engagement. <i>(Ministry of Science and Technology 2013)</i>	PhD enrolments as % of total HE enrolments (2015)	7.8%
		Prescribed time to completion for PhD	4 years
Annual PhD graduate output, average for 2006–15		90	
<b>Ghana</b>	<b>Key policy frameworks, targets and actors</b>	% of HE staff with PhD qualifications (2013)	31%
		Number of PhD programmes (2016)	200
	Ghana Shared Growth and Development Agenda II (GSDA II: 2014-2017): sets development priorities.	Number of PhD enrolments (2013)	1135
		PhD enrolments as % of total HE enrolments (2013)	0.8%
	Council for Science and Industrial Research (CSIR): oversees 13 research institutes.	Number of PhD graduates per year (2012–13) <sup>27</sup>	65
		Proportion of PhD graduates from flagship universities (UoG, KNUST 2013)	70%

25. Nega, M and Kassaye, M (2018) *A Study on Research and PhD Capacities in Sub-Saharan Africa: Ethiopia Report*. British Council and German Academic Exchange Service. Available at: [www.britishcouncil.org/education/ithe](http://www.britishcouncil.org/education/ithe) and also at <https://www.daad.de/download/phd201806>

26. The figures cited for each country are taken from the country reports, which draw on government data collected by the relevant ministry. It should be noted that this data may be based on different categorisations of 'higher education' and 'higher education staff'. For example, the data may or may not include staff at vocational colleges.

27. From the six oldest public universities (KNUST, UCC, UDS, EDW, UG, UMaT) (NCTE 2014).

**Figure 5:** Continued

<b>Kenya</b>	<b>Key policy frameworks, targets and actors</b>	% of HE staff with PhD qualifications (2016)	34%
		Number of PhD enrolments (2016)	7146
	National Science, Technology and Innovation Policy and Strategy (Kenya Government, 2010).	PhD enrolments as % of total HE enrolments (2016)	1.3%
	National Research Fund (NRF): manages and invests the funds for research and promotes multidisciplinary collaboration among universities and research institutions in Kenya. (Established 2013).	% of PhD enrolments at private HE institutions (2016)	16.72%
		Prescribed time to completion	3 years
		Average time to completion	6 years
<b>Nigeria</b>	<b>Key policy frameworks, targets and actors</b>	% of HE staff with PhD qualifications (2012)	43%
	National Research and Innovation Council (NRIC) and National Research and Innovation Foundation (NRIF): established in 2016 to set research priorities, co-ordinate funding and evaluate research outputs.	Number of HEIs providing PhD study (2012)	63
	Nigerian Expatriate Supplementation Scheme (NESS) and Linkages with Experts and Academics in the Diaspora Scheme (LEADS): established in 2007 to enhance internationalisation of faculty and increase the proportion of faculty with PhD qualifications.		
<b>Senegal</b>	<b>Key policy frameworks, targets and actors</b>	Number of PhD enrolments at University Cheick Anta Diop of Dakar (UCAD), the largest PhD provider, 2015–16	1252
	Fund for the Development of Scientific and Technical Research (FIRST): Established in 2007 to award research grants. Priorities are health, food security, agriculture, climate change, energy and the digital economy.	Number of PhD enrolments at University Gaston Berger of Saint-Louis (UGB), the second largest PhD provider, 2015–16	625
	Senegal Emerging Plan (PSE): summarises Senegal's development priorities and projections to be achieved by 2035. Most national development agendas including education and research have to be aligned to this vision.		
<b>South Africa</b>	<b>Key policy frameworks, targets and actors</b>	% of HE staff with PhD qualifications (2014)	43%
	Targets for 2030: 100 PhD graduates per million of the population 5,000 PhD graduates per annum 75% of permanent academic staff with a PhD.	Number of PhD enrolments (2014)	2258
		PhD enrolments as % of total HE enrolments (2014)	1.9%
		PhD graduations as % of total HE graduations (2014)	1.2%
	Equity targets for National Research Fund (NRF) scholarships: 80% black, 60% female.	Proportion of PhD graduates comprising international students (2014)	40%
		Average time to completion	5 years



# Research findings

The following section highlights key findings on PhD provision in terms of: the student characteristics; the structure and format of PhD degrees; the disciplinary spread of PhD provision; factors driving its expansion; the institutions that are providing doctoral education; funding of PhD provision; the quality of PhD provision from the perspective of alumni; as well as post-PhD trajectories.

## Who studies for a PhD?

While it was not possible to obtain detailed characteristics of the current or recent PhD student populations in all of the countries (with the exception of South Africa), it was clear from the institutional questionnaires and interviews that the majority of PhD students are mature students, rather than younger cohorts entering directly from master's degrees. Previous research has also identified the relatively mature age of PhD cohorts in the region, for example the mean age being between 35 and 45 years in South Africa.<sup>28</sup> Indeed, as noted above, current regulations and institutional pressure to produce more PhD-qualified faculty is driving expansion in enrolments. This corroborates findings from a study of eight flagship institutions in SSA, which found that master's to PhD conversion rates were very low.<sup>29</sup>

In South Africa, institutional strategies to recruit younger PhD students centre on improving the pipeline of master's graduates as a priority, as completion rates are a problem already at this level. A national level initiative to prioritise younger cohorts in state-funded PhD training is the New Generation Academics Programme (nGAP). It was launched in 2015, with universities

submitting 500 applications for these competitively awarded nGAP posts. Selection criteria are based on government-established equity targets and priority areas of research. The scheme has raised concern among some critics, however, as talented lecturers from historically disadvantaged (and typically more teaching-oriented institutions), in effect get taken up by historically advantaged institutions. This may result in concentration of research active staff in those institutions that are already better resourced and that already have higher proportions of PhD-trained faculty.

Related to this point above, there are serious equity concerns with PhD study in the region. In Ethiopia data was available on the gender distribution of PhD students. The data reveals that female enrolments have been rising in line with overall enrolments over the period 2000–15, but by 2015 females still only represented 12.1 per cent of enrolments and 6.3 per cent of graduates.<sup>30</sup> Racial inequity has of course been a concern in post-Apartheid South Africa. Significant gains have been made since the end of racial segregation; whereas 93 per cent of PhD graduates were white males in 1990, by 2015 only 37 per cent of the PhD graduates were white. International students mainly from the African continent represent 40 per cent of PhD students though, so their share may be exaggerating the positive gains in black enrolments. There may be other inequities resulting from patterns in PhD training, such as inequalities in the proportion of PhD-trained staff across the different institution types in the national systems (e.g. public versus private,

comprehensive university versus specialised colleges, polytechnics and other types, urban versus rural location). For example, based on available data we cannot say what proportion of the current PhD student body at the flagship institutions comes from those same institutions or from other institutions in the country, or even neighbouring countries.

## What structure and format does PhD training typically take?

In all the countries, the PhD is typically structured on the doctorate-by-research model, (rather than the 'taught doctorate' model used in North America), culminating in an oral defence of the thesis. In Senegal, the structure had been significantly different prior to the LMD<sup>31</sup> reform of 2012, with academics able to gradually build toward the PhD qualification through first and second cycle qualifications first. The LMD reform therefore represents a significant step toward standardisation of PhD provision in the West African region. Institutions in Ethiopia also reported use of the course-based mode, which requires taking advanced courses and undertaking academic research. PhD programmes included compulsory research training in all instances, but this varied by institution in the extent to which it was structured. Some institutions reported use of sole supervisors, and in fewer cases joint supervisory committees were also used. The study participants did not report on the use of a doctorate by publication route or the provision of professional doctorates – two significant growth areas in other regions, particularly the USA and the UK.<sup>32</sup>

28. Harle, J (2013) *Doctoral Education in Africa: A review of doctoral student needs and existing initiatives to support doctoral training and research development – A needs analysis undertaken as part of the DocLinks project*. London: The Association of Commonwealth Universities (ACU). Available online at: [https://www.acu.ac.uk/publications/?filters\[submit\]=Search&filters\[keyword\]=796](https://www.acu.ac.uk/publications/?filters[submit]=Search&filters[keyword]=796), page 1.

29. Bunting I, Cloete N and Van Schalkwyk, F (2014) *An Empirical Overview of Eight Flagship Universities in Africa*.

30. Nega, M and Kassaye, M (2018) *A Study on Research and PhD Capacities in Sub-Saharan Africa: Ethiopia Report*. British Council and German Academic Exchange Service. Available at: [www.britishcouncil.org/education/ihe](http://www.britishcouncil.org/education/ihe) and <https://www.daad.de/download/phd201806>

31. Licence-maîtrise-doctorat

32. Louw, J and Muller, J (2014) *A literature review on models of the PhD*. Centre for Higher Education Trust (CHET). Available online at: <https://www.chet.org.za/papers/literature-review-models-phd>

The prescribed length of programmes varied from three to six years. Alarming dropout rates and prolonged average time to completion were cited by university managers/heads of doctoral schools as a major challenge. Institutional responses in Kenya revealed that dropouts ranged from as low five per cent to as high as 50 per cent at others. In South Africa there is significant disparity between institutions and disciplines: a recent study reported that the completion rate<sup>33</sup> was as low as 25 per cent at the University of South Africa (UNISA), (the main institution offering online and distance provision), whereas the figure was 60 per cent at the University of the Western Cape (UWC).

In terms of format, PhD provision was almost entirely face-to-face, although in South Africa, distance PhD provision is also provided through UNISA. Enrolments in this mode were concentrated in

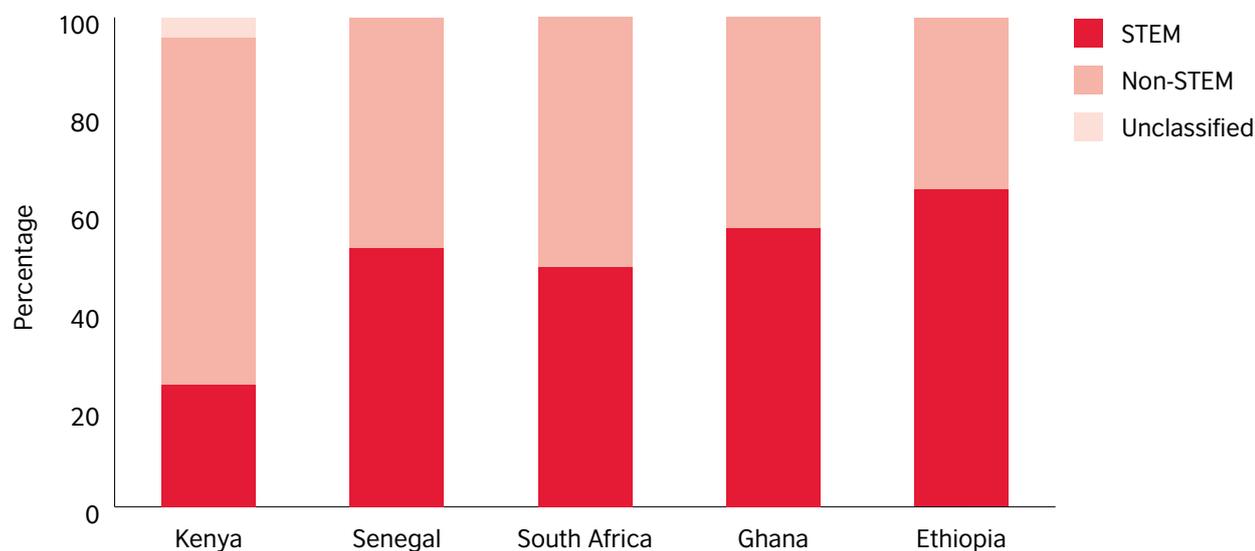
certain disciplinary areas, with 50 per cent of enrolments in education, theology, health and psychology.

### What are the disciplinary trends?

In each country context, science, technology, engineering and mathematics (STEM) subjects feature strongly in both the current research output and national policy documents dictating PhD capacity building. This focus on STEM is also evident in PhD provision, with a variety of core and applied sciences provided by institutions. It should be noted here that cross-country comparisons of disciplinary focus are problematic due to different subject classifications used, and a lack of national-level data on enrolments rather than just number of available programmes.<sup>34</sup> Nevertheless, we provide the trends in disciplinary spread in Figure 6 and Table 3

to give an indicative picture. As can be seen from Figure 6, the STEM versus non-STEM split is fairly even in Ghana, Senegal and South Africa, and skewed slightly in favour of sciences in Ethiopia. Kenya is the exception, as enrolments are skewed starkly in favour of non-STEM programmes. More than a third of enrolments there are in business and administration, while science subjects comprise less than five per cent each. A comparison of data over the past ten years revealed that non-STEM subjects experienced growth in their share of PhD production even in the countries where STEM subjects have traditionally dominated. For example, in South Africa graduations in business, economics and management grew at a faster rate than in health, which experienced much slower growth despite being ranked second in terms of overall graduate output.

**Figure 6:** STEM versus non-STEM subject coverage in PhD provision



Note: data not available for Nigeria

33. This means the proportion of students in a cohort who complete within the prescribed study time.

34. For example, there may be fewer programmes in the humanities, but higher student enrolments per programme than in the sciences. There may be high enrolments in a programme, but also high rates of dropout.

**Table 3:** Detailed breakdown of disciplinary spread of PhD provision

Country*	Source of data	Unit of data	Disciplinary spread	
Ethiopia	National data (EMIS 2015)	programmes	<b>STEM 64%</b> Agriculture and life sciences 22% Natural and computational sciences 16% Engineering and technology 16% Medicine and health sciences 10%	<b>Non-STEM 34%</b> Social Sciences and Humanities 29% Business and Economics 5%
Kenya	National data (CUE 2016)	enrolments	<b>STEM 25.17%</b> Health and welfare 4.8% Life sciences and physical sciences 4.8% Environment 3.91% Agriculture, forestry and fisheries 3.5%	<b>Non-STEM 71.42%**</b> Business and administration 35.1% Humanities and arts 10.9% Education 9% Social and behavioural science 8.2%
			The remainder of subjects comprise >3.5%	
Ghana	Sample of 10 institutions (2016)	programmes	<b>STEM 57.3%</b> Natural sciences, engineering and technology 57.3%	<b>Non-STEM 42.7%</b> Education 16% Humanities and social sciences 15.1% Business, economics and management sciences 11%
Senegal	UCAD 2014 (flagship institution)	enrolments	<b>STEM 46.33%</b> Environmental, health and life science 20.8% Physics, chemistry, earth and universe sciences and engineering 11.4% Mathematics and computer science 10.8% Water, quality and water use 3.33%	<b>Non-STEM 53.67%</b> Management, economic, political and legal sciences 24.6% Studies on the human being and the society 17.4% Arts, cultures and civilizations 12%
South Africa	National data (HEMIS 2014)	graduates	<b>STEM 49.03%</b> Life sciences and physical sciences 22.4% Health professions and related clinical sciences 10.8% Engineering 6.8% Agriculture, agricultural operation related sciences 3.5 %	<b>Non-STEM 50.97%</b> Education 10.1% Business, economics and management studies 8.5% Social sciences 7.4% Philosophy, religion and theology 5.9% Languages, linguistics and literature 4.9% Psychology 4.7 %
			The remainder of subjects have >3.5%	

\* Note: Data not available for Nigeria

\*\* Percentages do not add up to 100%. 3.54% of enrolments are classified as 'other', meaning we are unable to assign them to a STEM vs Non-STEM grouping

Research at institution-level also revealed that some institutions are now offering interdisciplinary programmes, driven in part by a need to pool resources (supervision, research training, general research infrastructure as well as research equipment). In Ethiopia, university staff stated that this strategy of pooling resources had been crucial for achieving the significant expansion in PhD provision there over the past decade. A separate survey from 2010 investigating PhD provision in the social sciences in SSA similarly noted the emergence of interdisciplinary programmes alongside traditionally defined disciplines.<sup>35</sup> The study found that 'core' social sciences such as anthropology and sociology were (a) fewer in number, and (b) often integrated into applied social science programmes such as Development Studies, or thematically-framed programmes such as Peace and Conflict Studies.<sup>36</sup> This trend toward interdisciplinary or thematically-organised PhD provision may help to generate socially relevant and innovative research output. A degree of flexibility and autonomy in HE governance structures is needed to support this trend. Accordingly, any strategies to expand this type of interdisciplinary or thematically-organised PhD provision will need to take into account the confines of existing governance structures. In Kenya, for example, it was noted that the parent-satellite campus model of HE expansion is very rigid, creating overlap in HE provision, as the satellite campus must provide exactly the same subjects as the parent campus.

### Factors driving PhD expansion and disciplinary spread

As noted above, a minority of current HE staff have doctorates. The most significant factor driving expansion in PhD provision indeed has come from pressure at the national level to upgrade the qualifications of higher education staff to the PhD level. In the case of South Africa, the government has set a specific target for this, namely 75 per cent of permanent staff by 2030. In three of the countries, there were specific laws or regulations mandating PhD qualifications for staff. In Senegal, a PhD qualification became mandatory for all teacher-researchers in public universities as part of the 2012 *licence-maîtrise-doctorat* (LMD) reform. The Kenya Commission for University Education (CUE) has passed a regulation mandating PhD qualifications for university teaching staff by 2018. A similar directive was issued by the Nigerian University Commission (NUC) in 2015 for lecturers wanting to rise to the rank of senior lecturer and above. In Ghana, while there is no such official regulation, there is still an implicit expectation for staff to obtain PhDs. In Ethiopia, the expansion in PhD enrolments is being driven mainly by the need to fill academic positions in the newly expanded HE sector, which has experienced phenomenal growth in the past decade; the number of public institutions grew from two in 2000 to 36 in 2015, and is expected to reach 45 by 2020.<sup>37</sup>

In terms of institutional decision-making on disciplinary focus of PhD programmes, the questionnaire data revealed that the most common factors are: institutional mission, department or faculty level capacity in terms of human resources, and to a lesser extent also the national research or national development agenda. While there was often alignment between institutional research planning and national development objectives, a key finding from the Ethiopian questionnaire was that there is a disconnect between PhD research topics and the broader institutional/national research agenda. Indeed, a policy gap identified in the Ethiopia study was the need for an evaluative framework at national level for judging the quality and relevance of research output, including PhD research output. A slightly different mood was observed in Ghana, where university leaders were divided on the merits and feasibility of aligning institutional research activity to a set national agenda. Another factor that needs to be considered in relation to the disciplinary spread of PhD enrolments is the nature of the student body. As will be discussed in the section below on funding, the majority of students are self-funding. Without paid studentships in priority areas, and the fairly high cost of PhD studies, it is not surprising that PhD research output reflects the demand side of individuals' research interests, capabilities and access to research resources, rather than the supply side of nationally-dictated priorities.

35. Harle, J (2010) *Scoping study of graduate teaching provision in the social sciences, governance and public policy* [Final Report]. The Association of Commonwealth Universities and Partnership for African Social & Governance Research. Available at: [www.pasgr.org/publications/graduate-teaching-provision-in-the-social-sciences-governance-and-public-policy/](http://www.pasgr.org/publications/graduate-teaching-provision-in-the-social-sciences-governance-and-public-policy/)

36. Harle, J (2010), *op. cit.* p.2. The data is drawn from national-level data on PhD programmes from Uganda, Kenya, Tanzania, Ghana, Zambia and Mozambique.

37. (Ministry of Education [MoE], 2016).

Industry and the private sector do not tend to be engaged in the process of determining new PhD programmes. This is consistent with the findings related to PhD students and alumni which confirmed that the majority of PhD students either already work or expect to find work in universities post-graduation. Hence, current PhD provision caters primarily to the academic workforce and institutional priorities, which must respond to in-demand subject areas in undergraduate and master's level enrolments. One recent policy was identified, however, pushing PhD provision more towards an industry, private sector and local development orientation: a 2017 governance reform affecting public universities in Senegal dictates that governing boards must now comprise a diverse range of stakeholders drawn from the private sector, business communities, local government, and professional corporations, including employers' organisations. This reform aims to stimulate HE-industry and private sector engagement, which may in turn result in diversification or specialisation of future PhD provision in the direction of commercial applicability.

### **Who is providing PhD training?**

Although there are no limits on PhD expansion imposed on institutions based on their characteristics (for example universities of technology, specialised colleges, comprehensive universities), in practice PhD provision tends to be concentrated in a small number of elite universities, in other words 'first generation', 'flagship', 'traditional' or 'historically advantaged' institutions. This is not surprising, as these tend to be the best-resourced institutions. They also have access to international/donor networks that can provide supplementary material and human resources, as discussed below. Private HE institutions are also beginning

to provide doctoral training in Kenya (Mount Kenya University, University of East Africa – Baraton) and in Senegal (African Institute of Management (IAM), Sup De Co – Dakar, African Center for Superior Studies in Management (CESAGI)). However, their collective enrolments constitute a minor share of PhD provision.

The issue of whether governments should pursue a strategy of concentration of PhD provision either geographically or according to institution type has been contentious. This in part reflects existing tensions and inequalities in the national systems. For example, in Nigeria there are plans to create six new 'mega-universities' across the country with a capacity of 150,000 students each in order to alleviate undercapacity in the existing public institutions. Critics argue that government funds should be invested in revitalising the existing public institutions. In terms of PhD provision specifically, there has been a debate among HE circles in South Africa whether institutions should be explicitly differentiated in terms of their research and PhD training functions, rather than every institution offering at least some PhD provision (as is the case now). Due to the complex political history, which resulted in advantaged and disadvantaged universities, the current government policy is to avoid such concentration of research activity into certain institutions, as this might exacerbate equity issues. These debates highlight the fact that government plans to expand PhD provision at the national level (whether directly via material support such as infrastructure and research equipment, or indirectly via funding formulas or regulations that incentivise or disincentivise PhD provision) need to strike a balance between the two considerations of efficiency and equity.

### **Quality of PhD provision from student and alumni perspectives**

The student and alumni questionnaire responses revealed that students were generally satisfied with their PhD education, although funding support was cited as inadequate. In addition, the following specific recommendations were given. Handbooks and regulations lacked specific evaluative criteria to judge the quality of students' progress, and in the case of Kenya, there was a need for a handbook on supervisory ethics. Although the Senegal report did not mention the issue of ethics of supervision specifically, the related issues of hierarchical organisational culture and poor supervisory commitment were cited by the authors as a challenge to quality PhD provision. Financial resources were also lacking to enable students to participate in international conferences or doctoral summer schools. A salient feature in each country context was the challenge of adequate supervision, whether in terms of finding a suitable supervisor with relevant expertise, or frequency and quality of supervisory meetings. In Ethiopia, it was noted that compulsory research training modules were often taught in intensive doctoral schools by visiting scholars, as there is a lack of staff within institutions to provide this training. The concerns raised by participants surrounding supervisory capacity and quality are not surprising given the resource constraints on the higher education sector in general in these countries, and in particular the shortage of PhD-qualified staff. The reliance on visiting scholars in Ethiopia highlights the challenges brought about by rapid expansion of PhD provision without sufficient staffing levels.

## Funding

In each country context, government funding for higher education in general is under strain, with institutions prioritising funding for their undergraduate provision. The proportions of university budgets allocated to research and PhD provision are low. Consequently, departments and doctoral schools do not normally offer paid studentships to PhD researchers. Instead, the majority of students are self-funding, relying primarily on teaching contracts, research consultancy, personal savings and financial support from their families to generate the necessary income. In Nigeria, it was noted that some institutions offer a 50 per cent rebate on tuition fees for their own staff members, as well as reduced teaching loads to aid with timely completion. Even in the case where government expenditure on higher education is relatively high, as in Ethiopia, there was still ambiguity and contention over the expected government contribution to PhD programmes. This is because no clear formulas have been established to standardise the per-student cost of PhD programmes. This serves as a reminder that extensive consultation between governments and institutions is needed prior to pursuing PhD expansion.

Government funding for PhD students takes the form of bursaries/grants and scholarships. In the case of Kenya, the funding can also be in the form of a loan. In the examples cited by interviewees/alumni, eligibility for government-sourced funds is based on academic merit, although there are a few examples where other criteria are used. In South Africa, eligibility for the National Research Fund (NRF) bursaries and scholarships

generally is based on merit, but top-ups are provided to incentivise certain subjects, namely those that fall under the Scarce Skills Development Fund (SSDF) criteria or the Department for Science and Technology (DST) research priority areas. In Senegal, FIRST awards research grants for higher education researchers, including PhD students, in the priority areas of health, food security, agriculture, climate change, energy and the digital economy.

A few instances of equity-related criteria were also identified. The Higher Education Loans Board (HELB) in Kenya provides a specific postgraduate bursary based on financial need, while the South African NRF has set equity targets of 80 per cent black and 60 per cent female for its awards. In Senegal, there is an initiative PAPES to support women researchers and researcher-teachers, which includes funding to help women complete their doctoral research.

Overall, however, it should be noted that in all country contexts, the student and alumni questionnaire data revealed that government funding (whether in the form of grants or loans) was minimal, and so did not have an impact on participation and completion. The exception to this was Senegal, where low tuition fees coupled with a national programme of doctoral grants means that PhD study is relatively affordable for many students. In Ghana, students and alumni were also asked whether regional governments (i.e. local or state governments as opposed to the federal government) or industry offer funding, but none of the respondents had received funding from these sources.

## International collaboration in PhD provision

Given the resource constraints described above, there is interest in exploring whether international collaborations could help either (a) expand PhD outputs via fully or partly funded PhD scholarships, or (b) enhance quality of current provision (e.g. specific aspects such as access to equipment, exchange of subject expertise, or skills training in PhD supervision). A survey of existing initiatives to support doctoral education on the continent by the Association of Commonwealth Universities (ACU)<sup>38</sup> identified several examples of the first mode of collaboration to grow student numbers. Such examples of fully-funded PhD scholarships include: (i) schemes that target the field of development studies, such as the Austrian Partnership Programme in Higher Education and Research for Development, or the Danish International Development Agency PhD scholarships; (ii) schemes that target mid-career professionals, such as the NUFFIC Netherlands Fellowship programme and the Swedish International Development Agency (SIDA) scholarships; (iii) schemes based on geographical and historical ties, such as the Commonwealth Scholarship Commission in the UK (with DFID), the New Zealand Commonwealth Scholarships, or the Canadian International Development Agency's (CIDA) Francophone Scholarship Programme; or (iv) funded PhD places which fall under broader partnerships schemes, such as DAAD's Inter-University Partnerships. In addition to these types of schemes funded by national governments or development agencies, this study also identified an example of private sector funding for PhD study

38. Harle, J (2013) *Doctoral Education in Africa: A review of doctoral student needs and existing initiatives to support doctoral training and research development – A needs analysis undertaken as part of the DocLinks project*. London: The Association of Commonwealth Universities (ACU). Available online at: [https://www.acu.ac.uk/publications/?filters\[submit\]=Search&filters\[keyword\]=796](https://www.acu.ac.uk/publications/?filters[submit]=Search&filters[keyword]=796)

in the case of Nigeria. The Petroleum Development Trust Fund (PDTF) scheme in Nigeria funds students on PhD programmes split between a Nigerian and an overseas partner institution (the so-called 'sandwich' or 'split-site' degree format).

The DAAD, in addition to its own scholarships for PhD studies at German universities (some of them also in the 'sandwich' format) has entered agreements with Kenya, Ethiopia, Ghana and Rwanda to jointly fund substantial numbers of extra doctoral scholarships to Germany.

There are three important caveats to mention regarding the international funding of PhD study. Firstly, it is important to note that comparatively little support goes to PhD study, while the majority of postgraduate scholarships target master's-level study.<sup>39</sup> Secondly, only a minority of schemes offer full funding intended for full-time study mode, leaving students and institutions to seek the remaining contribution.<sup>40</sup> Thirdly, the majority of scholarships fund PhD study outside of Africa in donor countries, rather than PhD study within the region. The exceptions to this trend are the DAAD-funded *In-Country and In-Region Scholarship* schemes for postgraduate study available to students from Sub-Saharan African countries.<sup>41</sup> The provision of in-country PhD study reflects two strategic commitments that the DAAD has made for its activities in Africa, namely to (i) upgrade the qualifications of university lecturers and (ii) build capacity for graduate education and research locally.<sup>42</sup>

The second area where international collaborations have potential impact is enhancing the quality of existing programmes. The institutions involved in this study revealed that they are indeed most commonly engaged in international collaborations that fall into this category, rather than increasing the number of PhD students. In terms of format, international collaborations typically comprise bilateral institution-to-institution arrangements between South–North members. The most common type of collaboration cited by institutions was that of joint research or doctoral training, although some arrangements include activities to enhance the quality of PhD provision specifically. For example the Next Generation of African Academics funded by the Carnegie Corporation includes skills training for supervisors and mentors to strengthen the quality of PhD supervision, (in addition to other activities aimed at early career researchers). More commonly, however, activities resulting from international collaborations comprise staff or student exchange, research training, workshops, joint research projects, mentoring and post-doctoral fellowships. Even when collaborations were not dedicated solely to PhD training, institutional leaders and heads of doctoral schools felt that they nevertheless had a positive knock-on effect on the PhD training environment. They were seen to benefit PhD students by enhancing the quality of the research environment more generally. A cautionary note should be added here highlighted by respondents from the Ethiopian study. Partnerships can be short-lived and lacking impact,

especially when the majority of funding is spent on acquiring visiting scholars to teach summer schools, rather than on building internal capacity to provide PhD training. The extremely rapid expansion of PhD provision in Ethiopia thus demonstrates the dilemmas created by outstripping supervisory capacity – institutions may utilise international collaborations to meet immediate, short-term needs of the current student body, and not for long-term capacity building.

Given the limitations of the bilateral model of international collaboration, there is interest in gauging the relevance of multi-institutional models. Furthermore, given the tendency for funded PhD awards to be granted for study outside of the continent, there is also a need to explore the option of South–South (or South–South–North) models of collaboration. Evidence from the country reports suggests that multi-institutional and South-South collaborations may indeed have greater potential to address the second qualitative concern of enhancing the effectiveness and quality of PhD training. The consortium for Advanced Research Training in Africa (CARTA) is one such scheme in the field of health science. Although it is funded by OECD donors, the consortium is led jointly by the African Population and Health Research Center (APHRC) in Kenya and the University of the Witwatersrand in South Africa. CARTA organises residential doctoral schools (called joint advanced seminars) for participating PhD students, which have reportedly been successful in promoting networking, peer support, and timely graduation. There is a South–North

39. Harle, J (2013) *op. cit.*

40. Harle, J (2013) *op. cit.* page 4.

41. Harle, J (2013) *op. cit.* page 6.

42. DAAD (May 2014). *DAAD Strategies for Countries and Regions: Academic collaboration with the countries of Sub-Saharan Africa*. Bonn: Deutscher Akademischer Austauschdienst (DAAD), page 4.

component as well, but its main objective is to provide mentorship and peer review on research outputs (such as draft thesis chapters). Another scheme following this model is the African Doctoral Academy PhD training hub based at Stellenbosch University in South Africa, funded by the Carnegie Corporation. It has an even wider remit than CARTA, as it is open to PhD students from any discipline. There is a plan to create a similar PhD training hub in West Africa at the University of Ghana, namely the Ghana Pan-African Doctoral Academy.

Given the study aims, less attention was paid to North-to-South inflow models of PhD training. Nevertheless, one example was identified in the Senegal country study, highlighting the potential for African research centres to provide doctoral training for Global North partners. The German Historic Institute in Paris and the Sorbonne Political Research Centre have partnered with UCAD to offer French and German students in-country doctoral training on a specific theme within African political studies. Further research is needed to gauge the potential for national or regional hubs in Sub-Saharan Africa to serve PhD students beyond the continent in this type of inflow model. Additionally, the potential for this type

of provision to enhance institutional ability to attract external funding for local PhD students in exchange type arrangements needs to be explored.

It was noticeable that institutions varied in the extent of their international networks. Those institutions with the most advanced and systematic internationalisation strategies driven by the senior management were naturally in a better position to develop and sustain international collaborations.

### **Where do PhD graduates go?**

As can be expected based on the typical PhD student profile as mature cohorts largely comprising existing university staff, the majority of students and alumni interviewed either are expecting to work in or have secured work in academia. There is little absorption into industry or the private sector. A comment from a member of the university staff in South Africa highlights this point: industry do not want employees with doctorates to conduct blue sky research; rather, they want practitioners with relevant practical skills to serve key development needs in areas such as clean drinking water.

In terms of institutional trajectories, the data collected was not able to reveal to what extent PhD students return to work in their 'home' institutions post-graduation, or whether they in effect get recruited to join the institution where they complete their PhD. The case of the nGAP in South Africa reminds us that concentration of PhD-qualified staff at elite or flagship institutions is a possibility. In Senegal, an issue raised was competition for academic posts with foreign-trained PhD graduates. This demonstrates that policies in domestic PhD provision need to be examined in tandem with existing patterns in overseas PhD provision. Therefore, further research is needed on trends in overseas PhD provision, and in particular on post-PhD employment patterns of returnee PhD graduates. Close monitoring of post-PhD trajectories for the domestically-produced cohorts is also needed to assess whether current post-graduation employment patterns are enhancing quality in the system overall or perhaps concentrating human resources in unequal ways.

# Conclusion and recommendations

On the basis of the findings generated from this study, and existing knowledge about doctoral provision in Africa, the following key conclusions and recommendations can be put forward:

- 1. All countries need to significantly expand their pool and increase their rate of production of PhD graduates*

PhD enrolments are on the increase across the African continent, in line with rapid expansion of the higher education sector as a whole. However, the doctoral level is not keeping pace with current needs of the countries. While attention to PhDs might appear a luxury in low and middle-income countries, this expansion is necessary both to facilitate the growth of undergraduate education while maintaining quality, and to ensure a vibrant research community (both inside and outside universities) to address societal challenges.
- 2. Substantial increases in investment in doctoral education are essential, including state investment*

Adequate financing is essential not only to ensure the quality of the programmes – and provide appropriate infrastructure and equipment – but also, through the provision of scholarships, to ensure that PhD students can dedicate themselves to their studies and complete in a timely fashion. Targeted funding can also serve to ensure equality of opportunity in doctoral programmes, supporting access for under-represented groups, on the basis of gender, race/ethnicity, rural/urban etc., and ensure successful completion.
- 3. Quality of programmes must not be jeopardised in the context of rapid expansion*

There are significant quality concerns across the countries, with evidence showing that standards of provision are slipping in the context of rapid increases in enrolments and diffusion across more institutions. Attention is needed to human resources in terms of availability of PhD supervisors, physical infrastructure in institutions and procedures of quality assurance. To an extent, countries are caught in a 'Catch-22' situation in that it is hard to ensure enough PhD supervisors without creating a faster throughput of PhD graduates. International partnerships can assist in overcoming this obstacle, as discussed further below.
- 4. Higher education systems need to seek a balance between concentration and diffusion of doctoral programmes*

There is considerable debate amongst the countries as to whether to allow the progressive diffusion of doctoral programmes across new public institutions and private institutions, or to concentrate in flagship universities and small numbers of centres of excellence. There are pros and cons to each of these options: centralising provision can serve to ensure high quality and create thriving centres of specialisation, but at the same time restrict access and prevent the development of new providers and programmes. Countries must find ways of reconciling these different considerations.
- 5. Countries should aim for a broad disciplinary spread in doctoral studies*

Many African countries are concerned about the levels of graduation in STEM subjects at all levels, including PhD. The findings above show that all of the countries have a substantial number of PhD programmes in STEM, though it is not clear in all cases how many students are graduating from these programmes. This is a complex challenge, as disparities at lower levels of education make it hard in the short term to increase the number of PhDs, and enrolments are determined as much by demand as any supply-side interventions. While it is important to promote STEM subjects, this should not be done to the detriment of other areas, and it is essential to national development to ensure vibrant research communities also in arts, humanities and social sciences, and in both basic research and applied areas, as is the case in OECD countries. The trend towards interdisciplinary PhD study in African countries also presents some interesting possibilities.

6. *Strong linkages should be developed between universities, communities, industry and government*

The quality and relevance of doctoral education and the research produced by PhD students can be significantly enhanced by interaction with stakeholders in non-university institutions. In some cases partnerships may develop commercial applications of research, but it is also important for doctoral students to engage with community interests to ensure that research addresses developmental needs of all segments of society.

7. *More extensive and more reliable data must be collected to inform policymaking around PhD provision*

Higher education institutions and national agencies must work together to ensure that relevant information on programmes, disciplinary focus, enrolments, completions, onward trajectories and other information are collected and available for analysis by policymakers and researchers.

8. *International partnerships can play a pivotal role in strengthening PhD provision*

There are a number of current initiatives underway supporting doctoral education in African countries, involving overseas higher education institutions, bilateral donors, multilateral agencies, philanthropic foundations, NGOs and international networks. These initiatives can have a significantly positive impact as long as the focus is on strengthening provision within the African countries, rather than siphoning off talent towards institutions in the Global North. South–South collaborations, often supported by international agencies, have significant potential in this regard.





# RESEARCH AND PhD CAPACITIES IN SUB-SAHARAN AFRICA: ETHIOPIA REPORT

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International  
**Higher Education**

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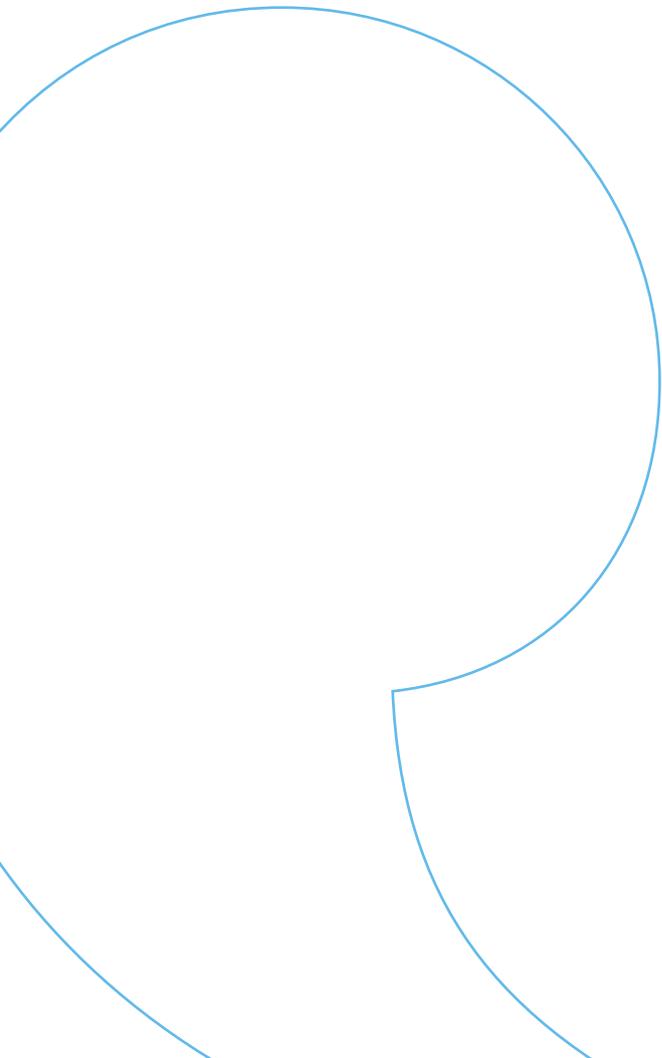
ANIE led the empirical research and produced the initial analysis, and then worked together with Dr Tristan McCowan and Elisa Brewis at University College London Institute of Education to finalise this country report.

Helmut Blumbach from the DAAD and Michael Peak from the British Council drove the study forward.

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# Foreword

**This report forms part of a broader study commissioned by the British Council and the German Academic Exchange Service (DAAD) that surveyed research and doctoral training capacity in Sub-Saharan Africa.**

The study includes six country reports, namely Ethiopia, Kenya, Ghana, Nigeria, Senegal and South Africa. This report addresses the outcomes of the study in relation to Ethiopia. The country reports include expanded contextualisation of the national research training landscape,<sup>1</sup> while a synthesis report is also available highlighting the key policy implications for PhD provision specifically.<sup>2</sup> The aims of the study were to investigate: (i) the availability, quality and thematic priorities of PhD

programmes and how they have changed over the last ten years; (ii) the national-level research agenda; (iii) the extent to which research training at the institutional level is aligned with the national agenda; (iv) national-level systems (policies and legislation) that facilitate alignment between institutional-level research training and the national agenda; (v) how institutional priorities reflect the needs of universities and emerging research and development systems, including local industry and societal challenges; (vi) funding sources to develop and sustain PhD provision; and (vii) the role of international collaboration in building PhD capacity. The research, analysis, interpretations, conclusions and recommendations included in this report are those of the report authors.

- 
1. Country reports can be found on the British Council website at <https://www.britishcouncil.org/education/ihe/knowledge-centre/developing-talent-employability/phd-capacities-sub-saharan-africa> and the DAAD website at <https://www.daad.de/en>
  2. The synthesis report can be accessed on the British Council website at <https://www.britishcouncil.org/education/ihe/knowledge-centre/developing-talent-employability/phd-capacities-sub-saharan-africa> and the DAAD website at <https://www.daad.de/download/phd201806>

# 1. The context of the higher education system in Ethiopia

Although Ethiopian higher education has a history stretching back more than six decades, its contribution in terms of research and knowledge generation for national development has been generally low. The system has faced several challenges, including poor quality and lack of relevance, poor research output, limited access, poor funding, inadequate staff capacities and overall lack of responsiveness to the developmental needs of the country (Saint, 2004; Amare, 2007). In response to these challenges several reforms have taken place since 2000 which have led to an increasing recognition by the government and some international partners of the significance of developing highly skilled human capital and research capacities for the transformation of the country. Accordingly, the Ethiopian government has ratified and implemented several reform initiatives and strategies (see the 2003 and 2009 Higher Education Proclamations, the Science, Technology and Innovation Policy, the 2008 Strategy and Conversion Plan, and Education Sector Development Programmes I–V) within the framework of the 1994 Education and Training Policy. These initiatives focus mainly on addressing the access, equity, efficiency, quality and relevance challenges that stifled the system for several decades. In this regard, Ethiopia embarked on expanding higher education by establishing more universities and colleges across the nation at an unprecedented pace and commitment. As a result, there

have been several positive changes, including a rapid expansion in student enrolment at all levels, the establishment of quality regulatory frameworks and bodies, and the strengthening of institutional capacities for research, among others.

The number of public universities in Ethiopia increased from two in 2000 to 36 in 2015. This number is expected to grow to 45 in the next five years (Ministry of Education, 2016). Private institutions have also grown from three in 1996 to more than 100 institutions in 2014–15 (four of which are universities) in total. This sector accommodated about 15.4 per cent of all student enrolment by 2014–15 (*ibid.*). There has also been a sharp growth in the enrolment of undergraduate students in both public and private institutions, with an increase from 34,589 to 729,028 students in just 15 years (2000–01 to 2014–15), showing an annual average growth rate of 33.8 per cent (*ibid.*). This has resulted in an increase from less than three per cent gross enrolment ratio (the proportion of students enrolled in higher education relative to the population of theoretical entrance age) in 2000–01 to about 10.2 per cent in 2014–15 (National Plan Commission, 2015).

Postgraduate education in the Ethiopian higher education system is a relatively recent phenomenon dating back to the late 1980s. Addis Ababa University started offering the first master's programmes in 1979 followed by the introduction of the first PhD programme

in 1987. Since then, the postgraduate programmes (master's and PhD) have also expanded rapidly due to the increasing demand from the expanding undergraduate programmes in the newly established public universities. Student enrolment in postgraduate programmes (both public and private institutions) increased from 1,286 in 2000–01 to 40,287 in 2014–15 (7.8 per cent are PhD students), showing an annual average growth of 102 per cent (Ministry of Education, 2016).

With regard to governance, the public universities operate under the auspices of different ministries, namely the Ministry of Science and Technology (Adama and Addis Ababa Science and Technology Universities); the Ministry of Civil Service (Civil Service University); the Ministry of Defence (Defence University) and the Ministry of Education (the rest of the public universities operate under this ministry). Education expenditure accounts for more than seven per cent of GDP and 24.9 per cent of the total public expenditure (*ibid.*). Higher education accounts for 49.5 per cent of the total education expenditure (*ibid.*). Recently, about 0.62 per cent of the annual GDP has been allocated for research. Public universities received more than 80 per cent of their budget from the government. Currently, there are 27,640 academic staff in both public and private higher education institutions. Staff with PhD qualifications account for just eight per cent of the total. This indicates a critical shortage of qualified staff with higher degrees.

## 2. Methodology

In line with the aims of the study to capture a cross-section of diverse higher education institution types, ten were selected for the study, all of which offer PhD programmes. To ensure diversity, the sampling criteria included age, size and status (comprehensive, specialised and university of technology). They were drawn from five regional states of the country. A detailed breakdown of the sample characteristics is presented in Table 1. Private universities in Ethiopia were excluded as they do not currently offer PhD training.

From these institutions data was gathered using a variety of approaches, namely questionnaires, interviews and review of institutional documents. A total of 97 participants from the ten universities completed and returned questionnaires (25 deans and associate deans, nine central directors and 63 department heads/chairs). Interviews were also conducted with 36 other participants (five academic vice-presidents, five vice-presidents for research and technology transfer,

seven directors for research and postgraduate programmes, 12 alumni and five directors of international relations). In order to provide cross-sector context to the institutional data, interviews were also carried out with representatives of the Ministry of Education, selected participants from industry and international partners active in the higher education sector.

**Table 1:** Profiles of the sampled institutions

Institution	Status/type	Location	Year of establishment as a university	Size (no. of campuses)	General student population 2014–15	No. of PhD programmes (year)	No. of PhD students enrolled in 2014–15
Addis Ababa University	Comprehensive	Addis Ababa	1950	14	52,870	76	1,874
Haramaya University	Comprehensive	Oromiya (Alamaya and Harar)	1985	2	35,239	18	672
Bahir Dar University	Comprehensive	Amhara (Bahir Dar)	1999	6	45,684	7	58
Mekelle University	Comprehensive	Tigray (Mekelle)	1999	6	30,991	5	53
Hawassa University	Comprehensive	Southern Region (Hawassa)	1999	4	34,529	7	43
Ethiopian Civil Service University	Specialised (in civil service)	Addis Ababa	2006	2	5,771	3	37
Jimma University	Comprehensive	Oromiya (Jimma)	1999	2	40,381	8	31
Adama Science and Technology University	University of technology	Oromiya (Adama)	2006	1	26,038	7	20
University of Gondar	Comprehensive	Amhara (Gondar)	2004	4	30,000	5	14
Ambo University	Comprehensive	Oromiya (Ambo)	2006	4	30,000	2	4

Source: Ministry of Education (Education Statistics Annual Abstract, 2006–15).

# 3. Availability, thematic priorities and quality of doctoral training

## 3.1 Availability of doctoral training

### 3.1.1 Expansion and capacity for PhD training in Ethiopian universities

Until 2002–03, two universities (Addis Ababa University and Haramaya University) had continued as the major providers of postgraduate programmes with stunted progress. The number of public universities offering PhD programmes reached ten in 2016 from only one in 2005. Enrolments in PhD programmes increased from 64 in 2006 to 3,135 students in 2015 (Ministry of Education, 2016). The need to expand PhD programmes at public universities has become evident in recent years and is supported by the fifth Education Sector Development Programme (ESDP V), which has set the direction for expanding PhD training for the next five years (2015–16 to 2019–20). Accordingly, PhD enrolment in public universities is expected to rise to 6,500 by 2019–20. The increasing demand from the newly established and expanding public universities for trained staff with higher degrees (master's and PhDs) and the growing need for a highly trained labour force are the major factors driving the growth of PhD training in Ethiopian universities.

The government has been using various strategies to achieve the targets set for PhD production. These include strengthening local PhD training through expansion of in-house capacity in the established and historically advantaged public universities (particularly Addis Ababa University). It has also developed partnerships with other universities especially in India and with the University of South Africa as strategic partners in PhD training. At the same time the government is encouraging

joint PhD programmes and scholarships with European universities. Some of these have been funded by international agencies such as the German Academic Exchange Service (DAAD), Netherlands Organisation for International Co-operation in Higher Education (NUFFIC) and the VLIR programme funded by the government of Belgium. There are also similar relations with universities in the USA and, recently, Asian countries (particularly Chinese universities).

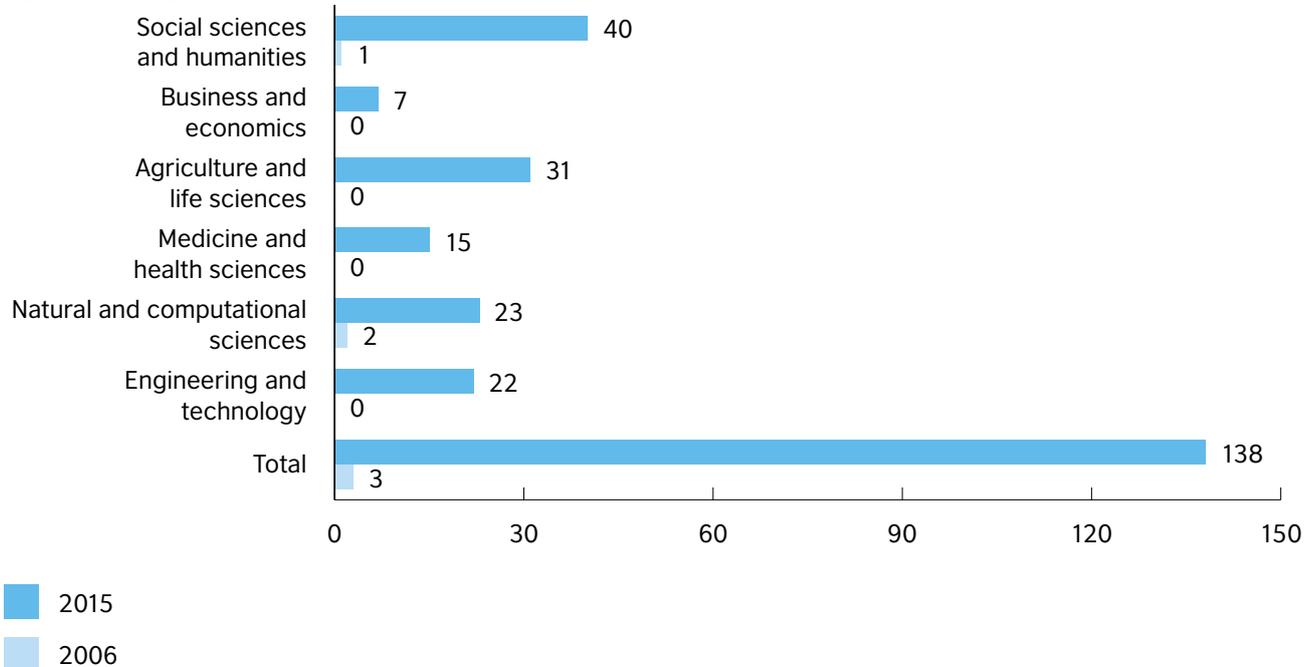
Despite the efforts made to expand PhD production, the numbers of staff with PhD qualifications has not been commensurate with the increase in student enrolment and rapid growth in number of universities (Ministry of Education, 2016). Currently, the staff qualification mix for universities is 32:60:8 (Bachelor's–master's–PhD), which is below the requirements set by the Ethiopian Ministry of Education (i.e. 70 per cent master's and 30 per cent PhD holders) (ESDP IV and V). As such, there is still a big shortage of qualified staff with PhD degrees in the public universities, which affects the quality of education and research in the universities (Nega, 2012).

Figure 1 shows that the number of PhD programmes increased from three in 2006 to 138 in 2015, indicating a significant rise in number and diversification of programmes within the past ten years. The increase in the number of programmes in the social sciences and humanities constitutes about 29 per cent of the total programmes, followed by agriculture and life sciences and natural and computational sciences. The universities are yet to develop their capacity to expand their programmes in the field of engineering and technology, which has recently been articulated in government national plans as a priority

area. In terms of institutional variations, Addis Ababa University constituted 100 per cent of the PhD programmes in 2006 and 55 per cent in 2015. We can also notice a substantial increase in PhD enrolment and graduation, as shown in Table 2.

Table 2 shows that PhD enrolment increased by more than 400 per cent over the past ten years. Despite this increase, the graduation rate of PhD students has not grown consistently, with figures fluctuating significantly (for example 149 in 2010, then only 21 and 76 in 2012, then rising to over 100 again from 2013 onwards). While the numbers graduating have increased, reaching a high of 335 by 2015, there are clearly challenges of throughput (with the average time to graduation being six years) and completion (with some students dropping out along the way). The overall PhD output figure is still low considering the deficits and increased demand for qualified staff in different disciplines in Ethiopian universities. The documents reviewed covering the period of the past ten years has also indicated that there are significant variations in the distribution of PhD graduates across the sampled universities, presented in Table 3. This demonstrates striking gaps in institutional capacity. It is noted that the majority of PhD graduates, (about 66 per cent) are produced by Addis Ababa University, followed by Jimma and Haramaya Universities, with 18 per cent and ten per cent of the total PhD graduates respectively over the past ten years. The study found that there are also serious capacity deficits in Ethiopian universities with regard to staff with PhD qualifications. The situation is even more pronounced in the newer universities, which are also yet to develop PhD training and research programmes in several fields.

**Figure 1:** Changes in quantity and type of PhD programmes, 2006 and 2015



Source: EMIS (Annual Education Statistics Abstract, MoE, 2006–15 and archives of the respective universities).

**Table 2:** Trends in PhD training, 2006–15

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total enrolment	64	122	258	325	791	789	1,849	3,165	3,292	3,135
% of female enrolments	4.7	2.5	2.71	8	5.9	12.5	17.3	11.2	11.2	21.1
Total graduation	7	10	19	15	149	21	76	115	152	335
% of female graduates	0	0	5.2	0	12.1	4.8	9.2	6.1	8.6	6.3

Source: EMIS (Annual Education Statistics Abstract, MoE, 2006–15 and archives of the respective universities).

**Table 3:** PhD graduates from public higher education institutions in Ethiopia, 2006–15

Institution	Status/type	No. of PhD graduates in 2005–06	No. of PhD graduates in 2014–15	Percentage of total PhD graduates
Addis Ababa University	Comprehensive	7	221	66
Jimma University	Comprehensive	0	61	18.2
Haramaya University	Comprehensive	0	34	10.1
Ethiopian Civil Service University	Specialised (civil service)	0	16	4.8
Bahir Dar University	Comprehensive	0	2	0.6
Adama Science and Technology University	University of technology	0	1	0.3
Ambo University	Comprehensive	0	0	0
Gondar University	Comprehensive	0	0	0
Hawassa University	Comprehensive	0	0	0
Mekelle University	Comprehensive	0	0	0
<b>Total</b>		<b>7</b>	<b>335</b>	<b>100</b>

Source: Ministry of Education (2016), Ethiopian Education Management Information System (EMIS) programmes.

### 3.1.2 Factors driving PhD expansion: institutional perspectives

Analysis of data from the questionnaire survey shows that there have been major changes in the PhD programmes due to various reasons over the past ten years. These changes include, among others, increasing intake capacity and diversification of programmes offered by the universities. This has been mainly as a result of increasing national demand for PhDs, particularly from the newly established universities; increasing dependency on expatriate staff due to the lack of in-house capacity to manage the increasing number of PhD programmes and the student enrolment; reviewing and modifying curricula and setting institutional agendas for research to address stakeholders' needs; and

closure of some programmes due to a lack of funding and concerns related to relevance. The increasing dependency on expatriate staff manifests itself in the employment of expatriate faculty and visiting professors on both a regular and contractual basis (the expatriate staff accounts for about 26 per cent of the total academic staff with a PhD qualification in public universities) for advising PhD students and for offering short-term courses in a block teaching mode. The dependency tends to be greater in the science and technology disciplines where the number of locally trained staff, especially those with PhDs, is very limited. This is an important finding because, ironically, it is the area of science and technology that the country wishes to expand fast in its higher education sector.

### 3.2 Thematic focus areas of PhD training

This section addresses the thematic focus areas of research and PhD training in Ethiopian universities. A general overview of the trends and their link to the national research priorities is presented here, while a more detailed account of the national agenda and alignment/misalignment with PhD training is provided in Section 4. The recent growth in the number of PhD programmes has contributed to the diversity of the programmes including new areas of training (see Table 4). Programmes are now available in different fields comprising engineering and technology, health sciences, natural and computational sciences, information technology, agriculture and life sciences, business and economics, social sciences and

humanities. It is notable that PhD graduates in the social sciences and humanities still constitute a significant proportion (41.8 per cent) of the total graduates, followed by natural and computational sciences, and medicine and health sciences with 21.7 per cent and 14.9 per cent respectively. PhD training in the fields of engineering and technology is a recent phenomenon and the proportion of graduates in these thematic areas is very low (3.4 per cent). This suggests a need for more emphasis on engineering and technology studies to address the requirements of the 70/30 graduate mix policy (in favour of science and technology) of the country.

With reference to the thematic areas depicted in Table 4, it is notable that by 2015 there had been a substantial increase in PhD programmes from two to 138. This increase and diversification of PhD programmes has been mainly due to government policy and commitment to expand university education, which has resulted in a huge demand for highly qualified teaching and research staff from the increasing number of universities being opened across all regions of the country, as reported by the majority of the respondents.

Additionally, 33 per cent of the respondents in the survey (mainly from Addis Ababa and Haramaya Universities) reported that there have been changes in PhD training in terms of curriculum/programme revision, admission requirements and enrolment/intake capacity, field of specialisation and mergers in some departments to update programmes to address new needs and stakeholder demand. In sum, the above developments indicate that though the social sciences are still the main focus of most PhD programmes, programmes in new fields, especially in science and technology, are beginning to emerge.

**Table 4:** PhD graduates by thematic focus area, 2006–15

Thematic areas	Year										Disciplinary coverage as percentage of 2015 total	2006–15 total	Disciplinary coverage as per cent age of 2006–15 total
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015			
Social Sciences and Humanities	4	0	5	6	25	7	28	55	89	157	46.9	376	41.8
Natural and Computational Sciences	3	6	10	6	8	7	24	40	39	52	15.5	195	21.7
Medicine and Health Sciences	0	1	4	3	96	1	8	5	4	12	3.6	134	14.9
Agriculture and Life Sciences	0	3	0	0	10	6	12	12	17	36	10.7	96	10.7
Business and Economics	0	0	0	0	10	0	0	0	1	56	16.7	67	7.5
Engineering and Technology	0	0	0	0	0	0	4	3	2	22	6.6	31	3.4
<b>Total</b>	<b>7</b>	<b>10</b>	<b>19</b>	<b>15</b>	<b>149</b>	<b>21</b>	<b>76</b>	<b>115</b>	<b>152</b>	<b>335</b>	<b>100</b>	<b>899</b>	<b>100</b>

Source: Ministry of Education (2016), EMIS and archives of the respective universities.

### 3.3 Quality of PhD training

Postgraduate training and programme structure in Ethiopian universities follows the 'graduate school model', where both PhD and master's programmes are managed and monitored by the office of graduate programmes (e.g. in Addis Ababa University) or the school of graduate studies (in the other universities) which is answerable to the vice-president for academic affairs. From the interviews carried out, it was notable that PhD training in Ethiopia comprises two modalities. The first is the course-based PhD that requires taking advanced courses and undertaking academic research. The other is the research-based PhD that requires the submission of a substantial body of original research (in the form of a dissertation) and assessment by a committee of examiners and an oral defence (similar to the model of many European countries). The other forms of PhD training such as higher doctorates and professional doctorates are not common in Ethiopian universities.

Ensuring high-quality PhD training requires putting in place a number of key conditions and frameworks. Having in place a quality assurance system and employing certain procedures and mechanisms for introducing, managing and reviewing programmes is considered crucial.

Findings from the questionnaires (26 deans and associate deans, nine directors of graduate programmes and quality assurance, and 62 department heads/chairs) and interviews (conducted with vice-presidents, directors of research and graduate programmes, and alumni) indicated that the universities (departments/colleges) were primarily responsible for initiating and introducing their PhD programmes and deciding on the course content and admission requirements. Government, industry, donors and other stakeholders very limited influence in the introduction of new PhD programmes. Nevertheless, most respondents felt that other factors such as stakeholder needs, labour market demand, university mission, research policies and strategies, national research priorities and resource availability influenced departmental decision-making in the establishment of new PhD programmes. Other important factors include availability of funding and the requirements of relevant professional associations in the establishment of the programmes. Funding was identified as a major impediment especially to resource-intensive programmes mostly in the sciences.

The questionnaire also probed institutional decision-making processes regarding expansion of PhD provision in more detail. The results indicated

that institutions considered other procedures such as needs assessment (88 per cent), stakeholders' consultative meetings (79 per cent), programme review results (65 per cent), and involvement of internal and assessors (74 per cent) in introducing new PhD programmes. However, procedures such as the results of tracer studies (30 per cent) and alumni surveys (31 per cent) as well as SWOT analysis (27 per cent) were not frequently employed in introducing PhD programmes across all the sampled universities. This suggests that ensuring quality while introducing new PhD programmes and admitting candidates is the primary responsibility of the universities.

Further analysis of the questionnaire data was conducted to understand the availability and effectiveness of quality-assurance systems for PhD programmes. The results are summarised in Table 5. The results show that some policies and structures for ensuring the quality of PhD programmes have been put in place in the sampled public universities. However, the existing systems and mechanisms for funding PhD programmes, co-ordination and management of PhD programmes and systems to promote a stimulating research and working environment for PhD students are not effective across all the sampled universities.

**Table 5:** Availability and effectiveness of policies and systems in improving the quality of PhD programmes

Policies and systems	Responses (percentage)*					Total**
	1 Not effective	2 Somewhat effective	3 Effective	4 Very effective	n/a	
Admission and procedures for PhD students	3.1	11.6	41.1	44.2	-	95
Institutional accreditation related to PhD	6.6	19.8	44	17.6	12.1	91
PhD programme accreditation	9	12.4	46.1	21.3	11.2	89
Systems and procedures for evaluating quality of teaching and learning in PhD programmes	7.4	22.1	41.1	26.3	3.2	95
Systems and procedures for assessing PhD research	6.3	23.2	40	24.2	6.3	95
Policies and procedures for supervision of PhD students	5.4	18.3	49.5	25.8	1.1	93
Institutional system for evaluating the organisation and quality of PhD supervision	6.5	25.8	45.2	19.3	4.3	93
Systems and procedures for monitoring the progress of PhD students	8.5	22.3	42.6	24.5	2.1	94
Regulations and procedures for thesis examination	2.2	12.1	41.8	42.9	1.1	91
Institutional system and mechanisms for funding PhD research	19.1	33	20.2	20.2	7.4	94
Institutional system for periodic review of PhD programmes	16.1	24.7	34.4	19.4	5.4	93
Structures to co-ordinate and manage PhD programmes	8.7	39.1	27.2	21.7	3.3	92
Structures to facilitate partnership industry/business sector on PhD training	9.5	23.2	32.6	24.2	10.5	95
Systems to promote a stimulating research and working environment for PhD students	19.1	31.9	28.7	16	4.2	94

\* The ratings in the responses represent 1 = not effective; 2 = somewhat effective; 3 = effective; 4 = very effective and 0 = not available

\*\* Total number of valid responses from deans, directors and department heads

**Table 6:** Adequacy and quality of resources and facilities

Resources	Adequacy (response in percentage)			Quality (response in percentage)		
	Adequate	Inadequate	Unavailable	Good	Satisfactory	Poor
Library facilities	43.8	56.2	-	37.5	52.1	10.4
Electronic learning resources	49.2	47.5	3.3	40.8	38.8	20.4
Research infrastructure	23.3	66.7	10	31.8	43.2	31.8
Web-based computer service	27.1	54.2	18.7	35.7	23.8	40.5
Working space for PhDs	23.4	65.7	10.9	26	37	37
Career development support	21.7	43.3	35	23.3	40	36.7

Source: Survey data collected through research (n=97).

The availability of adequate resources and facilities is a necessary condition for quality education in general and PhD training in particular. Results of the analysis of the questionnaire data regarding the availability and adequacy of resources and facilities are summarised in Table 6.

From the results in Table 6, it can be noted that the majority of respondents rated the resources and facilities as either inadequate or not good enough to support PhD training. This was a general trend across all the sampled universities. The resource challenge is, however, more serious in the newly established universities. This obviously affects the quality of PhD programmes across the universities, and in particular, the constraints related to research infrastructure, ICT support services, working space for PhDs and career development support. These aspects need serious consideration by the universities to enhance the quality of programmes. Another crucial quality issue was supervision of PhD students.

The results indicate that the overall supervision system is rated as not very effective by the majority of the student respondents across all universities; 3.4 per cent rated it not effective and 60.2 per cent somewhat effective, meaning that almost two-thirds of respondents were not fully satisfied with the supervision system. Of the remaining third, 32.95 per cent rated it as effective, and only 3.4 per cent rated it very effective. Seventy-three per cent reported that written regulations and standards were available. However, it was notable that the existing regulations and standards for PhD supervision were constrained by challenges such as lack of criteria for assigning supervisors, number of supervisors per candidate, regulations on number of meetings between PhD candidates and their supervisors, schedules for progress reports, training of supervisors and the code of ethics among others. The majority of the respondents (85 per cent) identified PhD supervision as a key challenge to PhD training. There was a serious

mismatch between the number of PhD students and the available supervisors, making it rather difficult for all the registered candidates to attain sufficient supervision. This was due to a shortage of senior staff with the qualifications that could allow them to supervise PhD candidates. As discussed earlier, this situation was much starker in the newly established universities. The universities also lacked support services for PhD students and even for effective supervision which included laboratories, research equipment and access to the internet. In some universities, there were no guidelines for PhD supervision leading to a lack of commitment from the existing supervisors. The supervisors in addition lamented about the poor incentives for their supervision. The allowances paid for supervision were low and at times were not forthcoming even after completing the supervision. Due to the deficits and challenges of supervision, there were some instances where departments allowed staff who had not attained the necessary

qualifications and experience to supervise PhD candidates. The number of candidates allocated to a supervisor was generally high even in the older universities, leading to some supervisors working with large numbers. This negatively impacted on the quality of supervision, dropout rates and even on graduation rates. One of the interviewees from Addis Ababa University noted that there is no financial support for PhD students and staff to attend and present papers at national and international conferences, and some of the students face challenges in undertaking their lab experiments due to the absence of equipped labs and reagents. Although the official time to complete a PhD is four years across all the sampled universities, the time to degree is on average six years. The proportion of PhD dropouts within ten years was found to be 10.7 per cent in this sample.

The questionnaire results were also corroborated by the findings of the qualitative data analysis gained from interviews with vice-presidents, directors and alumni. Generally, they were of the view that the quality of PhD training has been constrained by a lack of attention at both national and institutional levels. They cited the same challenges such as inadequate funding, poor research infrastructure, shortage of experienced supervisors, weak admission policies and procedures, and inadequate support systems for research, supervisors and for the

PhD candidates. These factors led to dissatisfaction of the students as was expressed by the students who had graduated from these programmes.

One of the alumni had to say:

*'The programme was opened without ensuring the availability of qualified staff and laboratory facilities when we started our studies. Once the programme was opened and enrolled students, nobody cares about the timely delivery of the courses. There were frequent delays in course offerings until the university invites someone from the established universities to teach the courses. During our studies we were constrained by lack of equipped labs including reagents and research funds to undertake quality research. Even, sometimes we were also required to look for a professor by ourselves from somewhere to complete our coursework and get supervisors – indicating poor co-ordination and management of the PhD training at all levels. These and related factors have negatively influenced on timely completion of our studies and conduct quality research.'*

(Member of alumni, 2016)

A significant number of alumni interviewees from other young and established universities also shared similar views regarding the effectiveness and quality of supervisors, despite the availability of written regulations and standards for supervision indicated in the questionnaire

responses (73 per cent of respondents) as discussed above. One of the alumni interviewees from a relatively established university noted that:

*'I was required to arrange flight booking and accommodation for my external examiner due to the archaic bureaucracy and negligence of the responsible bodies at central level. This obvious indicates lack of attention in facilitating and supporting our training from the management side at all levels.'*

(Member of alumni, 2016)

These responses by the alumni are corroborated by the views of the vice-presidents, directors and deans based on the interviews. The overall findings of the quantitative and qualitative data analyses indicate that the quality of PhD training and research at the universities is constrained by the multitude of factors mentioned above. In most cases, the PhD students are required to limit the scope and depth of their research project in line with the available funds, research infrastructure and facilities. The findings also indicate that the scope and quality of the PhD dissertations reflect this. As a result, the impact of the PhD research in terms of publication, innovation, technology transfer and solving national problems is minimal.

# 4. National research agenda and doctoral training

## 4.1 Defining the national agenda

### 4.1.1 Key national policy and legal frameworks

Ethiopia's Vision 2025 emphasises developing required human capacities and strengthening knowledge production through high-quality research. As indicated in the Growth and Transformation Plan (GTP II) (2015–16 to 2019–20), Ethiopia aspires 'to become a country where a democratic rule, good governance and social justice reigns upon the involvement and free will of its peoples, and once extricating itself from poverty becomes a lower middle income country by 2025' (National Plan Commission, 2015). This vision is the driving force for investing in human capital and research-intensive activities and enhancing the knowledge production capabilities of the country (GTP II) so as to be part of the middle-income economies. As such, a knowledge-intensive approach to development is increasingly becoming the main route for bringing sustained development in Ethiopia. The government believes that human capital affects growth through the efficiency with which assets are managed, utilised and maintained, through entrepreneurship and through innovation, which raises productivity, unlocks new investment opportunities and enhances export competitiveness (World Bank, 2010). Equally, research contributes directly to growth through embodied technological change that enhances productivity.

The National Development Strategy: Agricultural Development Led Industrialization is the major framework that sets the vision and strategies for Ethiopia's overall socioeconomic development and transformation. Other

policy and legal frameworks used by the government (Ministry of Education and Ministry of Science and Technology) to steer the higher education system in general and PhD training and research in particular include:

- GTP I–II
- the 1994 National Education and Training Policy
- Education Sector Development Programmes (ESDPs)
- the 2009 Higher Education Proclamation (No. 650/2009)
- the 2008 Ministry of Education's graduate mix (conversion plan) or the 70/30 strategy at the higher education sector
- the Ethiopian National Qualification Framework
- the 2012 National Science, Technology and Innovation policy.

The National Education and Training Policy is the basis for five medium-term (ESDPs I–V). ESDP V is the fifth medium-term plan which serves as the central strategy document for education development in Ethiopia for the period 2015–16 to 2019–20. It indicates the key targets for the higher education system, including PhD training, and highlights the research focus and directions. The 2009 Higher Education Proclamation is the legal framework for the operation of the higher education system in Ethiopia. The two main objectives pertinent to research include: i) preparing knowledgeable, skilled and attitudinally mature graduates; and ii) promoting and enhancing research focusing on knowledge and technology transfer. In terms of PhD training, Article 10 of the proclamation states that any institution can have programmes that lead to the award of bachelor's to doctoral (PhD)

degrees. With regard to research and research directions, the proclamation focuses on the relevance and quality of education and urges institutions to define their core research areas and themes on the basis of the priority needs of the country, the institutions' comparative advantages and in consultation with the key stakeholders. It allows universities to engage in joint research and develop human resources to pursue their research agenda and plans. In addition, universities are required to establish research and innovation funds, particularly to allocate sufficient funds for research focusing on technology transfer and innovation. The institutions are granted a good deal of academic and organisational autonomy, whereas the degree of their financial and staffing autonomy is perceived as being low (Mamo, 2015).

The Ethiopian National Qualification Framework is a new set of policies for the higher education sector. It is presumed to regulate the development, comparison and articulation of qualifications for recognition of learning in terms of agreed national standards, through which the subsectors of education and training are harmonised; and the pathways between them are developed to enhance access to and lifelong learning; and to empower all Ethiopians to contribute to economic transformation. There are 12 qualification types in the Ethiopian National Qualifications Framework, of which the doctoral degree is one (Education Strategic Center, 2016: 10).

The 2012 National Science, Technology and Innovation policy envisages the creation of a national framework that will define and support the way the country will in future search for, select, adapt and utilise appropriate and

effective foreign technologies, as well as addressing the establishment of a national innovation system (Federal Democratic Republic of Ethiopia, 2012). As shown in the policy document (*ibid.*):

*‘The national capability to learn, adapt and utilize foreign technology is still at very low stage; the level of qualified manpower capable of transferring foreign technology is low; a gap exists between research focus and activities in higher education and research institutions and the national development need; absence of a well-developed and systematized finance and incentive mechanisms to support technology transfer in manufacturing and service providing enterprises; universities are not taking the leading role and are lagging behind the industries for dealing with technology transfer; inadequate intellectual property system for accelerating technology transfer and expansion of local innovation activities, the current international cooperation lacks focus, among others.’ (p19)*

The policy establishes a National Science, Technology and Innovation council as one of the key regulatory structures for selecting and prioritising the national capacity-building programme, allocating resources and identifying national research priority areas. The Research and Technology Transfer Conceptual and Governance Framework of Ethiopian Higher Learning Institutions is another new policy framework that defines the vision, mission and objectives of the research and technology transfer framework, including opportunities and challenges. Under this framework, institutions will be supported through the provision of funding for innovation, perhaps on a competitive basis.

#### 4.1.2 Key actors in the national system

A substantial number of stakeholders are influencing agenda setting, policy development, policy determination and implementation, funding and evaluation for research and PhD training in the Ethiopian higher education system. The government, through its departments such as the legislative, executive and judiciary, is one of the salient stakeholders. Other stakeholders include non-governmental actors such as development partners, professional associations, the private sector and industry. Some of the key national actors in the higher education sector include: the Ministry of Education of Ethiopia; the Ministry of Science and Technology; the Education Strategic Center and the Higher Education Relevance and Quality Agency; the Ministry of Finance and Economic Cooperation; the House of Peoples’ Representatives and the Council of Ministers and the Ministry of Public Servants and Human Resource Development.

The Ministry of Education is the highest responsible body for defining and ensuring the responsiveness of Ethiopia’s higher education system to the public interest. The Ministry of Education is mandated to steer the higher education system and organisations within the broad legal and policy framework (Article 88 No. 1–13 of the Federal Democratic Republic of Ethiopia Higher Education Proclamation 650/2009). Duties and responsibilities of the ministry include defining the relevant and the minimum national educational quality standards, determining the requirements for degrees, ensuring the implementation

of the national policy and strategy on higher education, ensuring fair and just student access, determining key criteria for student admissions, determining criteria and standard procedures for government funding of institutions, issuing directives on higher education affairs, aligning higher education programmes with labour market demands, and appointing presidents and board members.

The Ministry of Science and Technology is an important regulatory body in the areas of science, technology and innovation. According to Proclamation No. 691/2010, the powers and duties of the ministry, among others, are to: i) prepare national science and technology research and development programmes based on the country’s development priorities and, upon approval by the government, provide necessary support for their implementation, follow-up and evaluation; ii) establish a system for technology needs assessment, identification, acquisition, packaging, utilisation and disposal, and follow up the implementation of the same; iii) register technology transfer made in every sector, co-ordinate codification and technology capability accumulation efforts, and ensure successive use of the same; iv) co-ordinate science and technology development activities and national research programmes; v) ensure that research activities are conducted in line with the country’s development needs; and vii) establish, co-ordinate and support councils that facilitate the co-ordination of research activities, etc.

**Table 7:** National thematic priority areas

Sector	Main thematic research areas
Agriculture and rural transformation	Crop production and productivity; livestock; natural resource conservation and utilisation; agricultural input supply and utilisation; food security, disaster prevention and preparedness; biodiversity; climate-resilient green economy
Industry	Leather, textile, metals, pharmaceuticals and chemicals, chemical and construction inputs, agro-processing, mining, biotechnology
Infrastructure development	Road, railway, energy, ICT, telecommunication, water and irrigation, transport and logistics service
Urban development, housing and construction	Constructing residential houses, urban productivity, food security
Human resource development	Education, health

The Education Strategic Center and the Higher Education Relevance and Quality Agency, which were established by the 2003 Higher Education Proclamation, are the two key intermediary organs between the universities and the government. They are responsible for overseeing the expansion of university education and quality assurance by ensuring the sustainability, affordability and relevance of academic programmes, including PhD training and research. However, these are yet to be realised in the Ethiopian higher education landscape. For instance, the establishment of public universities through governmental regulations did not meet the newly established accreditation process of the Higher Education Relevance and Quality Agency. The heavy involvement of the government itself in planning, budgetary matters and maintaining the quality of public universities has denied these organisations an active role as stipulated in the Higher Education Proclamation (650/2009). The Higher Education Relevance and Quality Agency, for instance, seems to be more engaged in matters of accreditation in private higher education organisations than public ones.

The Ministry of Finance and Economic Cooperation is one of the important stakeholders in the Ethiopian higher education and research landscape. It prepares and administers the higher education budget from the government treasury and supports public universities in negotiating, mobilising and signing foreign development assistance and loans with bilateral countries and multilateral organisations (Proclamation No. 651/2001). The House of Peoples' Representatives and the Council of Ministers sets out the general legal framework for the development of higher education (including PhDs) and research in Ethiopia. As the key regulatory authorities, these two actors collectively determine and approve education and training policy, science and technology policy, higher education law and budget. Finally, the Ministry of Public Servants and Human Resource Development is an important stakeholder for issuing directives regarding the planning for administrative support staff at higher education and research institutions. The Federal Civil Servants Proclamation (No. 515/2007) is the key regulatory tool in this regard.

#### 4.1.3 Thematic priorities

As a national development plan for Ethiopia, the Growth and Transformation Plan (GTP) provides direction and guidelines regarding the thematic priorities for PhD training and research. The overall objective of the GTP is to sustain broad-based, fast and equitable economic growth (maintaining an annual average real GDP growth rate of 11 per cent) so as to eradicate poverty in due course and thereby contribute to the achievement of Ethiopia's vision of being a middle-income country by 2025 (Ministry of Finance and Economic Development, 2010). It is also entrusted with pursuing aggressive measures towards rapid industrialisation and structural transformation. The GTP gives more emphasis to the thematic areas that are linked to poverty reduction. The national priority areas of the GTP include agriculture and rural transformation; industry; infrastructure development; urban development; housing and construction; and human resource development. These are presented with more detailed examples of research areas in Table 7.

In line with GTP priority areas, the Ministry of Science and Technology has identified priority technology transfer and development sectors, namely agriculture, agro-processing, biotechnology, construction, chemical and pharmaceutical, information technology and electronics, leather, metal and textile. With regard to higher education, the focus is on enhancing expansion while maintaining the relevance and quality of education, as well as strengthening the system of innovation development and implementation, human resource capacity building and acquisition of skilled manpower for technology transfers. During the implementation of GTP II (2015–16 to 2019–20), enrolment in PhD programmes is expected to grow from 3,169 to 6,500 in favour of science and technology.

The above-mentioned broad thematic areas are expected to move the country quickly to acquire the higher-order skills and expertise that will allow it to add value to existing economic activities and enter new industries and services. They also serve as the basis for increasing the country's comparative advantage by pushing the frontiers of technology through innovation.

#### **4.2 Alignment between institutional research priorities and the national agenda**

In this section, we provide the findings regarding the extent to which institutional research and PhD training support the national agenda. It critically examines the availability and adequacy of institutional policies, thematic priority areas, and strategies related to research and PhD training and their link to the national agenda.

##### **4.2.1 Institutional research capacity, policies and priorities**

Research plays a key role in the knowledge production process of organisations, especially universities. Research has been articulated as one of the missions of the Ethiopian universities since their inception. The importance of building the research capacity of universities is also emphasised in recent national development policies and plans of the government as a means to build national capability in knowledge production, technological learning, and the adaptation and utilisation of effective technologies (see Ministry of Science and Technology, 2012). However, a shortage of capable researchers has been a serious obstacle to building the research capacity of the Ethiopian universities. The proportion of researchers per million of the population is lower than the African average (UNESCO, 2015).

A review of the existing documents (university strategic plans, institutional research policies, senate legislation, etc.) shows that most of the participant universities have designed policies and strategies in response to the requirements of their immediate environment. These policies and documents include research policies, thematic priority areas, research strategic plans, research incentive policies and university–industry handbooks.

All the participant universities have put in place a research policy, a research strategic plan (a separate document in the case of Adama University), research priorities and thematic areas. Addis Ababa University is the only institution that designs and implements a

research incentive policy to encourage the publication and dissemination of research outputs by academic staff. This policy has helped to facilitate research and knowledge production activities in the institution. The universities also use competition for research funding based on the priority thematic areas of the university as a strategy to stimulate the research engagement of staff. Results of the data analysis emanating from the questionnaire survey also indicate that the sampled universities are engaged in research and knowledge exchange activities.

Analysis of the documentary evidence shows that almost all the participant universities have identified thematic research priority areas based on needs assessment in their respective environments. The thematic research areas are organised by research groups at department level.

**Table 8:** Research thematic priority areas in universities

Institution	Thematic research priority areas	
Adama Science and Technology University	<ul style="list-style-type: none"> <li>• Health</li> <li>• Chemical manufacturing</li> <li>• Energy</li> <li>• Information and communication</li> <li>• Water resources</li> <li>• Natural resources development</li> </ul>	<ul style="list-style-type: none"> <li>• Crop production</li> <li>• Education and training</li> <li>• Mining</li> <li>• Water and irrigation construction</li> <li>• Wood and bamboo processing</li> </ul>
Addis Ababa University	<ul style="list-style-type: none"> <li>• Information and communication technology</li> <li>• Tropical and infectious diseases</li> <li>• Materials science and nanotechnology</li> <li>• Industrial process and product improvement</li> <li>• Minerals and energy</li> <li>• Transport technologies and infrastructure development</li> <li>• Agriculture, agro-processing and biotechnology</li> <li>• Environment, natural resources and biodiversity</li> <li>• Gender and gender relations</li> <li>• Water resources management</li> <li>• Health and nutrition</li> </ul>	<ul style="list-style-type: none"> <li>• Non-communicable diseases</li> <li>• Healthy systems (human and animal)</li> <li>• Animal production and health</li> <li>• Language and communications</li> <li>• Applied ethics and sage philosophy</li> <li>• Land and tenure policies</li> <li>• Business and economics</li> <li>• Ethnic identity and interethnic relations</li> <li>• Population and migration</li> <li>• Historical perspectives</li> <li>• Resources analyses and social enterprise development</li> <li>• Archaeology and heritage management</li> <li>• Quality of education</li> <li>• Conflict, peace and security</li> </ul>
Bahir Dar University	<ul style="list-style-type: none"> <li>• Alternative energy forms (biodiesel, biogas, fuel)</li> <li>• Basic science research</li> <li>• Exploration of space technology</li> <li>• Textile, garment and fashion design science and industry</li> <li>• Fisheries management and aquaculture</li> <li>• Educational and behavioural sciences</li> <li>• Epidemiology of significant diseases</li> <li>• Engineering and technology</li> <li>• Environmental science</li> </ul>	<ul style="list-style-type: none"> <li>• Food security and livelihood</li> <li>• Natural resource management</li> <li>• Aquatic and wetland</li> <li>• Food, water and sanitation</li> <li>• Business and economics</li> <li>• Social sciences</li> <li>• Maternal and child health</li> <li>• Disaster risk reduction</li> <li>• Public health</li> <li>• Accessibility, equitability and quality of healthcare</li> </ul>
Ethiopian Civil Service University (ECSU)	<ul style="list-style-type: none"> <li>• Public administration policy</li> <li>• Public financial management</li> </ul>	<ul style="list-style-type: none"> <li>• Urban planning and development</li> </ul>
University of Gondar	<ul style="list-style-type: none"> <li>• Engineering</li> <li>• Natural and computational sciences</li> <li>• Medicine and health sciences</li> <li>• Social sciences and humanities</li> <li>• Agriculture</li> </ul>	<ul style="list-style-type: none"> <li>• Veterinary medicine</li> <li>• Business and economics</li> <li>• Law and governance</li> <li>• Quality of education</li> </ul>

**Table 8** continued

Institution	Thematic research priority areas	
Haramaya University	<ul style="list-style-type: none"> <li>• Productivity, and environmental sustainability for food security, and poverty alleviation</li> <li>• Energy, engineering and information technologies</li> <li>• Human health, nutrition and welfare</li> </ul>	<ul style="list-style-type: none"> <li>• Institutions, innovation systems and economic development</li> <li>• Basic science research</li> <li>• Human and social development</li> </ul>
Hawassa University	<ul style="list-style-type: none"> <li>• Productivity and environmental sustainability</li> <li>• Energy, engineering and ICT</li> </ul>	<ul style="list-style-type: none"> <li>• Institutions, innovation systems and economic development</li> </ul>
Jimma University	<ul style="list-style-type: none"> <li>• Food security and livelihood</li> <li>• Health and health deliverability</li> <li>• Institutional innovations and management</li> <li>• Relevance and quality of education</li> </ul>	<ul style="list-style-type: none"> <li>• Social justice and democracy</li> <li>• Environment and climate change</li> <li>• Appropriate technology adaptation and transfer</li> <li>• Science</li> </ul>
Mekelle University	<ul style="list-style-type: none"> <li>• Arid agricultural sciences</li> <li>• Natural resources conservation and management</li> <li>• Food and nutrition</li> </ul>	<ul style="list-style-type: none"> <li>• Public health</li> <li>• Education</li> </ul>

From Table 8, it is notable that all the universities have identified their thematic research priority areas which seem to have a number of similarities especially due to their alignment to national research priorities of the government. These findings are corroborated by the responses from the questionnaire survey and interviews in which the respondents from all universities confirmed the availability of an institutional research agenda that has a strong link with the country's national research agenda. One of the respondents from Jimma University

affirmed the essence of adhering to the national research agenda as the government is the source of funds for their research and PhD programmes. Most of the respondents underlined the link between the institutional agenda and the national research agenda, as the former is based on the latter. The interviews with vice-presidents and directors of research programmes also confirmed the availability of thematic research areas that are in line with the national research priority areas stipulated in the GTP, although the actual implementation of the agendas

is in its infancy. The respondents in the dean and department head groups further confirmed that some guidelines have been issued by their respective universities to help faculty to properly implement the research priorities set. It can therefore be inferred from this that research and PhD endeavours in Ethiopian public universities are guided to some extent by the country's national development plans and strategies.

**Table 9:** The link between PhD research and the university's research priority agenda

Item	Responses (percentage)				Total*
	Unrelated	Less related	Somewhat related	Highly related	
The extent of alignment of the university's research agenda to national priority agendas	1.1%	4.6%	39.1%	55.2%	87
The extent of alignment of the PhD research to the university's research priority agenda	20.6%	40.3%	22.2%	16.9%	87

\* Refers to the total number of valid responses (deans, directors and department heads).

#### 4.2.2 Misalignment between the research agenda and PhD training

Analysis of the documentary evidence shows that the link between the research and PhD training is not well articulated in the senate legislation and related policies of the participant universities. Table 9 presents the extent to which PhD research projects were related to the universities' research agenda and national priorities in the experience of deans, directors and department heads.

From Table 9 we can observe that the universities' priority research agenda is closely related to the national research agenda (94.3 per cent responded either somewhat or highly related). In stark contrast, 60.9 per cent of respondents felt that alignment of these research activities to PhD training was either unrelated or less related. The dichotomy between research and PhD training is

also reflected in the governance structure of the universities, where the academic vice-president is in charge of the postgraduate programmes, including PhD training in colleges, schools and teaching institutes, and the vice-president for research and technology transfer is responsible for all the university research programmes undertaken in the research institutes and other colleges. Regarding the design of PhD provision, the majority of the respondents (55 per cent) reported that the involvement of stakeholders in determining the research priority and thematic focus areas in the universities is low. Similarly, the existing systems and strategies of research in facilitating knowledge-exchange activities with stakeholders are less effective. This suggests that a clear framework that governs the synergy in PhD training and its contribution to research is missing across the universities.

The results from the interviews also showed that there is an overlapping of responsibilities between the two offices of the academic vice-president and the vice-president of research, particularly PhD programmes. For example, Addis Ababa University has introduced thematic research projects that require the involvement of PhD candidates. However, the involvement of PhD candidates in most of the thematic research projects of the university have not materialised due to the lack of strategies and policy directions regarding the synergy between research and PhD training across teaching colleges and research institutes. Hence, as it stands today, there is a weak link between PhD training and research across the Ethiopian universities.

### 4.3 National-level structures to support the provision of relevant PhD training

#### 4.3.1 National quality-assurance frameworks for research and PhD training

In the Ethiopian context, systematic quality assurance is a recent phenomenon that can be traced back to the establishment of the Higher Education Relevance and Quality Agency in 2003 following the issuance of the Higher Education Proclamation in the same year. The national quality assurance framework involves both internal and external quality assurance systems. The external quality assurance system is based on quality audits for public universities and accreditation for private institutions. Institutional quality audit is at the centre of the external quality assurance system. The Higher Education Relevance and Quality Agency is entrusted by the proclamation with the responsibility for guiding and regulating the quality and relevance of higher education and encouraging the development of an institutional quality culture in the country. The proclamation also requires each higher education institution to establish and implement an internal quality enhancement system.

However, a review of the documentary evidence and research outputs (Nega, 2012) indicates that the national quality assurance system is not robust enough to ensure the quality of the higher education outputs. For example, ensuring the quality of PhD training, research and knowledge production is not clearly indicated in the ten focus areas of the external quality assurance system outlined by the Higher Education Relevance and Quality Agency. So far, there is no clear system for regulating/evaluating the quality and relevance of research and PhD graduates. Most of the PhD programmes are not subject to accreditation. Hence, there are limitations in assuring the quality of PhD training and research in the country.

#### 4.3.2 The need for a national support system

One of the outstanding findings in this study is the lack of a national framework to support research and PhD programmes in public universities. All respondents unanimously admitted that universities by and large operate in seclusion within their own contexts. Accordingly, there is inadequate support in mapping out strategies for developing their PhD programmes and providing the required resources and capacities for quality research and training.

Some respondents from the public universities cited the Education Strategic Center of Ethiopia as one of the national institutions supporting the institutional research agendas of universities. They confirmed that there were no national frameworks or institutions to help public universities to carry out research in the areas of their own priorities. They did, however, mention the existence of some research institutes in the areas of agricultural research outside the universities that aim at helping researchers in the field. It appears clear from their responses that there is more support for research in agriculture as food security is a key priority of the government. Government support was mainly through research funds, especially through the national research council. There was, however, not much national support towards other national-level organisations offering PhD programmes.

# 5. Engagement with industry, the private sector and social challenges

## 5.1 Industry–university links

In 2013, the Ministry of Science and Technology issued a procedural directive for the linking of education and training, research institutions and industry in pursuance of the powers vested in it under Article 22(6) of the Proclamation 691/2003. The main objectives of promoting these links was to provide for the development of students' skills through practical training and to enhance needs-based research that responds to new realities of Ethiopia. Ultimately, the link was to lead to the development of a culture of joint planning and operation among these actors by pooling resources.

However, linking institutional research priorities to the needs of industry was marked by almost all respondents as a new phenomenon in Ethiopia. It was noted that universities were just starting to work with industry and did not have much experience with such engagements. The fact that Ethiopia had recently launched the scheme of industrialisation was a step that could enhance university–industry collaborations. It was also notable that there was a low level of awareness and experience by higher education institutions of the role of industry in the training of graduates and later in their employability. A respondent from Addis Ababa University observed that the development of university–industry links in Ethiopia is just emerging amid several constraints. Several factors, such as the low level of industrial expansion, the inability to sort out

needs and the limited capacity to project markets on behalf of the industry, contribute to the poor university–industry link in Ethiopia. However, although the overall scenario for collaboration and working with industry appears to be limited, relative strengths were reported in the interviews, for example from Addis Ababa University, Jimma University, and Adama Science and Technology University.

Several respondents from Addis Ababa University explained that public universities engage the public, especially key stakeholders, in setting out their institutional research agenda and in establishing new PhD programmes. This is done through the needs assessment undertaken when establishing new academic programmes. Stakeholders from the public participate in the needs analysis process thereby articulating their needs and interests. Through this process the universities attempt to respond to societal needs. The respondents also mentioned that the opening of a university–industry link office in Addis Ababa University was an important step towards creating better and beneficial relations with industry.

However, respondents from the industrial sector reported that the universities were not very responsive in meeting industry needs and even taking up the opportunities that the industry could offer. They pointed out opportunities for research, industrial attachment, joint supervision and even utilisation of some scientific facilities

in the industry as some areas where the universities could have started benefiting. The universities were also not producing commercially attractive research and innovation outputs that could be useful to industry, though the industrial sector was still small and developing. As one of the respondents from industry reported, the industries prefer to import experts from abroad to work in technical maintenance services at a lower cost compared to what they pay to experts of local universities. This suggests that the readiness and willingness to engage in collaboration is yet to be developed in both the universities and the industrial sector.

## 5.2 Impacts of research and doctoral training on social challenges

Ethiopian universities, particularly the first-generation ones, have long been criticised for their lack of responsiveness in addressing societal challenges through their research and training. A review of the previous government national development plans and strategies indicate that the universities have been lagging behind in terms of aligning their training to national development requirements. Despite the large number of research projects and publications that have come out of the universities, not much of this has been translated for societal interventions. Ethiopia has attained a 50 per cent improvement in publication citation impact over 20 years (Thomson Reuters, 2014) but

the impact of these research outputs on areas such as technological changes and productivity has been minimal. Most of the technology transfer activities currently carried out in the country are not in line with the envisaged technology demands of the development programmes. In this regard, one of the interviewees from Addis Ababa University asserted the following:

*'Most of the research works undertaken by the academic and research institutions and PhD students are either shelved or presented in conferences or published in journals for the purpose of academic promotion. The research results are contributing in terms of ideas and policies, but do not reach the market in terms of patents and technologies for the industry. For example, Addis Ababa University through its history gets only one patent internationally so far.'*

(University respondent, 2016)

In general, the national capability to learn, adapt and utilise new technology is still at a very early stage (Ministry of Science and Technology, 2012). The contribution of Ethiopian universities to the world stock of knowledge is also generally low (World Bank, 2010).

Recently, universities have in some cases started to design and introduce their thematic research areas and PhD training programmes based on national development priorities. Examples include the thematic research project and PhD programmes in the areas of

tropical and infectious diseases and nutrition undertaken by Jimma University, which have impacted on policymaking at the national level and also in addressing practical challenges in these fields. Similarly, the new PhD programmes in biotechnology, water resource development, railway engineering, biomedical engineering and nutrition at Addis Ababa University are also expected to address the country's shortage of manpower in the recently expanded railway infrastructural facilities and the industrial inputs supplied to industries. This is a clear indication that if new PhD programmes address the rising needs of the country in the final analysis, this endeavour would help to solve societal problems.

Such examples show that there is a good start in terms of creating a link between expanding new PhD programmes and areas of research and solving societal problems quickly, although this is in its infancy. In response to this understanding many public universities, especially Addis Ababa University, Jimma University, Haromaya University and Bahir Dar University, have included increasing the size of their postgraduate student enrolment, especially PhD candidates in their strategic plans for the next five years. In an attempt to solve their lack of sufficient resources and skilled human resources, universities have recently launched an innovative mechanism for clustering themselves in close proximity to each other and working together by supporting each

other and sharing resources and experiences. There are, however, still notable challenges observed such as limited budget and poor university administration and management systems, as was remarked on by an informant in a statement: 'University board may change structure by their own if they wish. Universities may run departments, but salary and fund requirement are not left to universities due to financial constraints.'

The lack of a strong link with industry and the absence of centres of excellence for research and PhD training remain a challenge across the universities. An important strategy for improving the existing poor management system may be to introduce continuous leadership and management capacity development training for all engaged in higher education and university leadership in general. Likewise, the budget constraint experienced by universities may be mitigated by developing the internal revenue generation capacity of universities and helping them to develop partnerships with international universities.

# 6. Funding sources to develop and sustain PhD training

## 6.1 Funding of research

The main source of research funding for Ethiopian universities is from the government treasury, income generated by universities from various sources, and partners (local and international). As briefly discussed in the previous sections, the share of the higher education budget of the total education budget has been reasonably high compared to the lower tiers of the education system (Mamo, 2015). However, funding for research from the government is often inadequate and was totally unavailable until 2012. Due to soaring student numbers, most funding was allocated to staff salaries and teaching requirements instead of research (*ibid.*). In 2011–12, the research budget of all universities accounted for only one per cent of their total budget and the percentage of research budget of the GDP is 0.28 per cent (Ministry of Education, 2015). The inadequacy of research funds has been hindering the research capacity of universities in terms of research infrastructure, facilities and equipment, as reported by the majority of respondents.

In recent years, there has been increasing demand for universities to play a critical role in the socioeconomic transformation of the country through

production of new knowledge and innovations. Accordingly, the Ethiopian government has slightly modified its budget allocation mechanism by providing more funds for research and development among others (Mamo, 2015). This new development in budget allocation brought universities on board to identify their thematic research areas and improve their staff profiles. In GTP II emphasis is given to improve the research capacity of universities by establishing a National Research Undertaking Framework and defining National Research Priorities (Ministry of Education, 2015). Additionally, the share of research funds from the annual recurrent total budgets of institutions will grow to five per cent.

## 6.2 Funding of PhD programmes

The share of the higher education budget of the total education budget in Ethiopia is also among the highest in Africa. The education share of Ethiopia's GDP increased from 2.8 per cent in 2000–01 to seven per cent in 2010–11, and this will grow to ten per cent by 2019–20 (Ministry of Education, 2015). Between 2005–06 and 2013–14, on average the share of the higher education budget of the total education budget was about 27 per cent. The

UNESCO Institute of Statistics data indicates that the proportion for tertiary education was as high as 42.7 per cent in 2013 (UIS, 2018). The education share of GDP in Ethiopia is higher than the Sub-Saharan African average (Mamo, 2015). The major source of investment in education including PhD training is still from the government treasury.

There is, however, no documented evidence regarding the actual cost per PhD candidate. The documentary evidence shows that about 20,000 birr (an estimated \$870) to 30,000 birr (\$1,300) are uniformly allocated as PhD research funds for social science and natural science streams from government sources. The maximum amount for PhD research varies from university, especially due to specific institutional initiatives. Generally, the universities have raised the concerns of inadequate research funds with the government and there are attempts to address this through different efforts. Funding remains a major constraint to research and PhD training in Ethiopian universities.

# 7. The role of international collaboration in building PhD capacity

## 7.1 Bilateral partnerships beyond Sub-Saharan Africa

International partners and donors have contributed immensely to growth of higher education and research in Ethiopia (Teferra, 2008). A good example is the co-operation between Addis Ababa University and the Swedish government among others aimed at expanding PhD programmes. Most of the initiatives for partnerships

in public universities in Ethiopia are rooted in North America, Europe and Asia, with very few with African institutions. Public universities in Ethiopia, especially the first-generation universities, have academic partnerships with universities in China, Germany and the USA. Ethiopian universities also enjoy partnerships with universities and donors from the Scandinavian countries, especially Sweden, Denmark and Norway, as illustrated in Table 10.

As further illustrated in the same table, the older universities such as Addis Ababa University, Bahir Dar University and Mekelle University have better shares of overall international partnerships compared to the newer universities such as the Adama Science and Technology University. Addis Ababa University seems to enjoy a high number of partnerships with international universities, especially in terms of postgraduate programmes.

**Table 10:** Public universities and a description of their partners and areas of partnerships

Universities in focus	International partner institutions	Major areas of partnership
Addis Ababa University	Engineering, natural sciences, health sciences, business administration; organisations and societies: the BC, IIEPS, CHEPS, SIDA/SAREC; several universities in China such as the East China Normal University; universities in Japan such as Kyoto University; universities in the USA and North America such as the Ohio State University, Howard University and University of Prince Edward Island; universities in Western Europe such as the University of Jyvaskyla; universities in Africa and South Africa such as the University of South Africa and Khartoum University	Staff and student exchange, joint research partnership; PhD-level graduate programmes (PhD-level independent, sandwich and consortia programmes, and post-doc, curriculum development and instruction, PhD research, advisement, examination, etc.); as Addis Ababa University works with local, national and international partners and collaborators, the partnerships and collaborations are in teaching, advisory/supervision, invigilation, joint research, funding, staff and student exchange
Adama Science and Technology University	Aarhus University (Denmark); Alberto Iria School (Portugal); USA–Israel–Spain Exchange	Master’s-level graduate programmes (such as master’s and postgraduate diploma level, curriculum development and instruction MA researches, advisement, examination, internship, etc.)
Ambo University	Third World Academy of Sciences (TWAS-UNESCO) (Italy), EFASA (Addis Ababa), MGDC (India), DZF (Switzerland), I-CARE (Italy), IOBB International (Kampala, Uganda) and SABS (India); Bristol-Myers Squibb Foundation–Secure the Future Program	Ecosystem conservation and sustainable development; teaching and research
Bahir Dar University	University of the Western Cape (South Africa); University of Aberdeen (Scotland); Texas Tech. University (USA); Kathmandu University (Nepal)	Joint research, exchange of staff, external establishment of new programmes, exchange of information and publications, organisation of conferences and workshops
Ethiopian Civil Service University	University of Graz, Institute of International Law and International Relations; Department for International Development; The American Bar Association, Rule of Law Initiative	Exchange of professors to teach in the PhD and master’s programmes
Gondar University	Punjab University (India); Ohio State University (USA); DAAD (Germany)	PhD-level graduate programmes such as in nursing and public health, joint-curriculum development and review
Haramaya University	International Centre for Development Oriented Research in Agriculture, Wageningen (the Netherlands); University of Kassel (Germany)	Research and staff exchange

**Table 10** continued

Universities in focus	International partner institutions	Major areas of partnership
Hawassa University	Norwegian University of Life Science, Norway; Oregon State University (USA); Oklahoma State University (USA); Saskatchewan University (Canada); Swedish University of Agricultural Science (Sweden); the Christensen Fund; Colorado State University (USA); Justus Liebig University Giessen (Germany)	Teaching, research, training, staff exchange
Jimma university	VLIR Belgium universities; Brown University (USA); Canadian Network for International Surgery (Canada); JUCAN Project; Rostock University (Germany); Ludwig Maximilian University (Germany)	Student and staff exchange, joint research collaboration
Mekelle University	NORAD Phase II Project; VLIR-Institutional University Cooperation	Improvement of rural livelihood in Ethiopia; Supporting development-oriented research; dissemination of research findings; capacity building; human resource development; establishment and strengthening the graduate programmes; facilitating university reform; special support for female and disabled students; promoting university–industry links; promoting south–south links

## 7.2 Professional networks and associations within and beyond Sub-Saharan Africa

The universities also have links with other international research organisations and professional networks, and belong to international university associations. They have partnerships with organisations such as the Western Hemisphere African Diaspora Network, the Ethiopian

Distance Learning Association, the Global Educational Network of Ethiopia, the International Open College of Ethiopia, the Global Education Network of Ethiopia, the Africa Foundation for Development, Africa Recruit, the Africa Capacity Building Foundation, the Forum International for Ethiopians Living in the Diaspora, and the International Society of African Scientists.

### 7.3 Types of activity and scale of collaborations

International partnerships comprise a diverse range of activities and vary in their scale or degree of partnership. Some partnerships focus on exchange of resources and provision of academic infrastructure (such as ebooks and journals), while others focus on human capacity development and continuous professional development including trainings, staff and student exchanges, information exchange and team teaching. There are also partnerships focused on graduate programmes and development of new areas of study. Many of the public universities surveyed in this research have emerging partnerships focused on strengthening PhD programmes. A number of partnerships have also focused on community development projects and joint researches which have led to joint publications. Generally, international partnerships in Ethiopian universities is a growing phenomenon.

It is, however, important to note that sustainability has been a key challenge to these partnerships. In this regard, Addis Ababa University has attempted to build in ways to sustain the outcomes of their collaborations beyond the

partnership period. Addis Ababa University has for several decades enjoyed long-lasting partnerships with international organisations such as the British Council, the German Academic Exchange Service (DAAD) and the Swedish Development Fund, for example. Among several of the partnerships with the British Council, for instance, the British Council in Ethiopia was recently awarded a contract by the Ethiopian Federal Ministry of Education to manage a partnership programme between Ethiopian and international universities for the development of home-grown postgraduate programmes in engineering and technology, including PhD programmes.

### 7.4 Challenges in forging partnerships

Ethiopian universities face several challenges in their internationalisation activities. The challenges include an inadequate human resource base, the level of academic quality and standards to attract more partners, and inadequate facilities and resources for internationalisation activities. Another challenge is the fact that the partnerships do not in many instances

consider local contexts of the Ethiopian institutions. This has led to some partnerships not leading to useful outcomes. These have also led to imbalances in aspects such as students' mobility in which there is more flow of students from universities in developed countries to Ethiopian universities than vice versa. In some supposedly joint projects it is common to observe that much of the project funding goes to cover the costs of visiting professors from outside instead of genuinely developing the capacity of faculty in local universities such as by way of training and short scholarly visits. Some of them are not founded on genuine interest in helping the universities seeking the partnership to improve their programmes of studies. As a result of this tendency, many partnerships, programmes and projects launched remain short-lived and the donations or funds to maintain sustainability are lacking.

# 8. Conclusion

In exploring the research and PhD capacities in Ethiopian universities, this study has established the existence of both national and institutional research agendas in Ethiopia and a strong link between the two. The study further established the existence of a number of regulatory and policy frameworks for the higher education system which also regulate and facilitate research and PhD training in Ethiopia.

Overall, an important and positive change is the expansion in PhD programmes, increase in student numbers in these programmes and the development of policy frameworks to regulate research and PhD training and also enhance their quality. At the same time, it is important to note that the private universities and the new public ones still have few postgraduate programmes and a very weak research base. The study noted several challenges facing research and PhD training in Ethiopia, with funding and inadequate human resource capacities being the most constraining to the sector.

The universities have their research and PhD training priorities which are aligned to the government agenda for research. This is more pronounced in the public universities, where most of the research in Ethiopia is done. The public universities have been encouraged by the government to develop their own context-friendly

institutional research agenda and thematic priorities based on national frameworks and policies. Of concern, however, is the fact that there were notable similarities in the disciplinary areas of focus. In a developing higher education system such as that of Ethiopia and the capacity and funding constraints identified, it would have been useful if the institutions were differentiated and specialised in particular crucial fields of study and research to maximise on the benefits. Almost all public universities in the country offer PhD programmes in identical disciplines or fields of studies without considering the unique demographic and socioeconomic context of the regions and states in which the universities are operating. Such a practice may also jeopardise the already meagre resources the country has as they are spent on redundant programmes of study when they should have been wisely spent on different and yet very crucial fields of study that may be important for promoting national development.

Though still at low levels, developments in partnerships were witnessed between national universities and international institutions and between national industry and public universities. The link between universities and industry appears to be in its very initial stage characterised by a lack of clear national legal and policy

frameworks to guide the collaboration between universities and industry and by a lack of sound management and leadership in order to get both sectors to work together in various forms. The contribution of international partners and stakeholders was identified as being critical for knowledge sharing and transfer of skills in order to enhance the PhD capacities of national public universities. It was also evident that the universities, especially the public universities, have started to develop different types of partnerships with both national and international counterparts. Some of these are aimed at strengthening their research and PhD training capacities. Though the nature and level of partnership varies from university to university it was noted that the impacts have been positive, especially to established universities such as Addis Ababa University and Mekelle University, which have a number of international partnerships and joint programmes whereas many recently established universities have very limited programmes of study in partnership.

# 9. Recommendations

The research and PhD training capacity in Ethiopia is still small, weak and facing several challenges. Innovative approaches to expand PhD training and enhance research production in Ethiopia need to be pursued. The following recommendations are suggested:

1. Given the mismatch between the rapid expansion of higher education and the availability of academic and financial resources, there is need to reconsider the pace of university expansion in Ethiopia, especially with focus on the quality implications and constraints to resources brought about by these developments.
2. While there has been a rapid expansion in the number of universities and enrolments including at PhD levels, the system is not differentiated to offer training in varied fields. As already noted the universities are almost replicas of each other. It could have been useful if each university developed own areas of expertise based on existent capacities and strengths. There is a need to promote specialisation in programmes of study and research areas, especially in the postgraduate programmes, and thereby improve/enhance programme quality.
3. The study noted a very weak relationship between PhD training programmes and the needs of the labour market. The programmes need to be highly competitive and linked to labour-market needs to provide students with employment opportunities on completion. This would also make the universities relevant to labour market demands and societal needs, and even enhance relations between universities and the industry, which at the moment are low. The universities could revise and align their programmes to these new realities without compromising their quality and institutional priorities.
4. Institutions also need to improve their student support services and put in place a flexible accommodating and diversity-sensitive student support system that has the capacity to address student mobility.
5. Given the current low remunerations and lack of other incentives for academic staff and researchers in Ethiopian universities, it would be difficult to retain high-quality staff within the system vis-à-vis better paying sectors of the economy. This is more so for staff in very specialised fields, especially those in science and technology, which are also in high demand by other sectors. Aggressive initiatives have to be introduced into the sector in order to meaningfully boost the working and professional morale of both faculty and support staff in all public universities through sustainable incentive mechanisms and reward schemes.
6. Public universities should introduce and implement a robust quality assurance system and thus a holistic context-friendly quality enhancement plan to enhance the quality of their programmes and enable graduates from the sector to win jobs easily in the labour market. The leadership in those public universities should take an immediate initiative to put in place such a system as the existing mechanisms to ensure the desirable quality in higher education, especially PhD programmes, do not appear to be sufficient or effective.
7. Finally, the effective implementation of the existing national frameworks should be assured to their full extent to steer the behaviour of all the actors concerned (universities, industry and government) towards strengthening the quality and productivity of PhD programmes and research capacity in the country. Importantly, what has emerged from this research is that the close co-ordination and orchestration of all programmes of study and research directions across public universities, as stipulated in the policy guidelines and regulations, is lacking.

# References

- Amare, A (2007) Academic freedom at the Addis Ababa University. PhD dissertation. Norwich: University of East Anglia.
- Education Strategic Center (2016) ENQF Draft Regulation, Unpublished. Addis Ababa: Education Strategic Center.
- Federal Democratic Republic of Ethiopia (2003) *Higher Education Proclamation (No. 351/2003)*. Addis Ababa: Negarit Gazeta.
- Federal Democratic Republic of Ethiopia (2009) *Higher Education Proclamation (No. 650/2009)*. Addis Ababa: Negarit Gazeta.
- Mamo, F (2015) *Revenue generation strategies in Sub-Saharan African universities*. Enschede: University of Twente.
- Ministry of Education (2016) Ethiopian Education Management Information System (EMIS) programmes, 'Education Statistics Annual Abstract 2007 E.C. (2014–15) Addis Ababa, Ethiopia'.
- Ministry of Finance and Economic Development (2010) 'Growth and Transformation Plan (GTP)', Addis Ababa, Ethiopia.
- Ministry of Science and Technology (2012) *Science, technology and Innovation policy*.
- National Plan Commission (2015) *The Second Growth and Transformation Plan (GTP II) 2015/61–2019/20*. Addis Ababa: Federal Democratic Republic of Ethiopia.
- Nega, M (2012) *Quality and quality assurance in Ethiopian higher education: critical issues and practical implications*. Enschede: University of Twente, Enschede.
- Park, C (2007) *Redefining the Doctorate*. York: The Higher Education Academy.
- Robbins, S, Bergman, R, Stagg, I and Coulter, M (2000) *Management*. Upper Saddle River: Prentice Hall.
- Saint, W (2004) *Higher education development in Ethiopia: pursuing the vision*. New York: World Bank.
- Saint, W (2004) Higher Education in Ethiopia: the Vision and its Challenges. *Journal of Higher Education in Africa/Revue de l'enseignement supérieur en Afrique* 2/3: 83–113.
- Teferra, D (2008) 'The international dimension of higher education in Africa: Status, challenges and prospects', in Teferra, D and Knight, J (eds) *Higher education in Africa: The international dimension*. Accra/Boston: AAU/CIHE.
- Tiwana, A (2002) *The Knowledge Management Toolkit*. Upper Saddle River: Prentice Hall.
- UIS (2018) Education Indicators. *Expenditure on tertiary as a percentage of government expenditure on education (%)*, 2014.
- UNESCO (2015) UNESCO Science Report: Towards 2030, UNESCO, Paris.
- World Bank (2010) *Financing higher education in Africa*. Washington, DC: World Bank.









# RESEARCH AND PhD CAPACITIES IN SUB-SAHARAN AFRICA: GHANA REPORT

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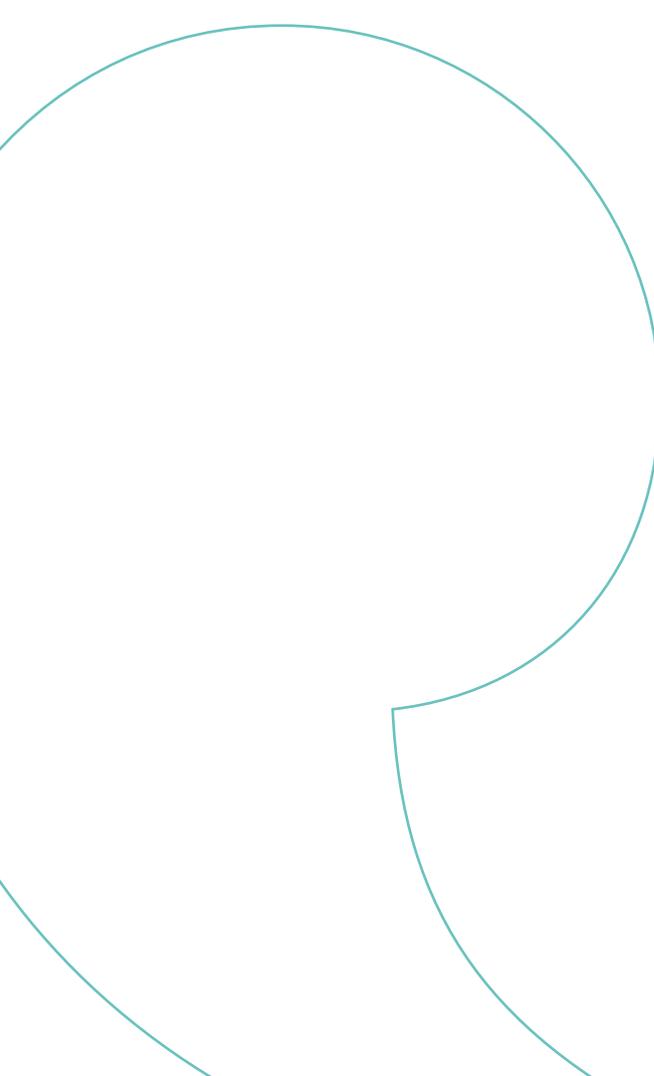
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# Foreword

**This report forms part of a broader study commissioned by the British Council and the German Academic Exchange Service (DAAD) that surveyed research and doctoral training capacity in Sub-Saharan Africa.**

The study includes six country reports, namely Ethiopia, Kenya, Ghana, Nigeria, Senegal and South Africa. This report addresses the outcomes of the study in relation to Ghana. The country reports include expanded contextualisation of the national research training landscape,<sup>1</sup> while a synthesis report is also available highlighting the key policy implications for PhD provision specifically.<sup>2</sup> The aims of the study were to investigate: (i) the availability, quality and thematic priorities of PhD

programmes and how they have changed over the last ten years; (ii) the national-level research agenda; (iii) the extent to which research training at the institutional level is aligned with the national agenda; (iv) national-level systems (policies and legislation) that facilitate alignment between institutional-level research training and the national agenda; (v) how institutional priorities reflect the needs of universities and emerging research and development systems, including local industry and societal challenges; (vi) funding sources to develop and sustain PhD provision; and (vii) the role of international collaboration in building PhD capacity. The research, analysis, interpretations, conclusions and recommendations included in this report are those of the report authors.

- 
1. Country reports can be found on the British Council website <https://www.britishcouncil.org/education/ihe/knowledge-centre/developing-talent-employability/phd-capacities-sub-saharan-africa> and the DAAD website <https://www.daad.de/en>
  2. The synthesis report can be accessed on the British Council website at <https://www.britishcouncil.org/education/ihe/knowledge-centre/developing-talent-employability/phd-capacities-sub-saharan-africa> and the DAAD website <https://www.daad.de/download/phd201806>

# 1. The context of the higher education system in Ghana

## 1.1 Historical development

At independence in 1957, Ghana's first president, Dr Kwame Nkrumah, had recognised the importance of knowledge production for the needed rapid development and transformation of the newly independent Ghana (Ministry of Environment, Science and Technology, 2010). From independence, the new government envisaged that Ghana needed an educational system that could produce a scientifically and technically minded society. Apart from inputs made in basic education, it was recognised that universities were to be the driving engine of the envisaged development (Akyeampong, 2007). Ghana thus embarked on investments in higher education to achieve these aspirations.

By 2016, higher education in Ghana had dramatically expanded to include various institutional types delivering different programmes. By the beginning of 2017, there were ten public universities, four chartered private universities, 72 private tertiary institutions offering degree programmes under tutelage (i.e. private university colleges), ten polytechnics (some of which have been converted to technical universities), one distance-learning institution, 45 colleges of education and 29 nurses training colleges (National Accreditation Board, 2017). Between 2010 and 2015 student enrolment in the tertiary institutions grew from 217,543 to 320,746 (Ministry of Education, 2017). Despite this growth in the number of institutions and student enrolments, research production has not grown at the same rate. In the same vein, doctoral training has remained low despite efforts towards its expansion.

Though the higher education sector comprises several institutional types as discussed above, the bulk of research production and PhD training is dominated by the public universities. Only two of the over 70 private university colleges offer PhD programmes. Between 2010 and 2013, enrolment for doctoral students in Ghanaian universities grew from 715 to 1,135 (National Accreditation Board, 2015), a large growth, but in absolute terms is still low compared to international benchmarks. The majority of these doctoral students were registered at the University of Ghana (UG).

The higher education sector is regulated by two main agencies falling under the Ministry of Education: the National Council for Tertiary Education (NCTE) and the National Accreditation Board (NAB). The NCTE is mandated to advise the sector minister in charge of education on the development of tertiary institutions and to formulate policies to regulate tertiary education. Additionally, it has budget and financial responsibilities for the sector. The NAB on the other hand is responsible for accreditation of public and private tertiary institutions in Ghana. The NAB develops benchmarks for accreditation and quality assurance, ensures proper operations of accredited institutions and maintains acceptable levels of academic or professional standards. For accreditation to be granted for academic programmes including those for PhD training, NAB requirements have to be met. These include documentation reviews, site visits to the institution seeking accreditation, confirmation of availability of adequate and well-qualified staff, well-equipped library facilities and other infrastructure including classrooms, lecture theatres, laboratories, workshops and equipment. These steps are undertaken to ensure that programmes meet prescribed quality standards.

## 1.2 The current research and PhD training landscape

Given the role that some Ghanaian universities play in doctoral training, it is deserving to ask critical questions about their capacities and capabilities for PhD training. Answers to such questions will provide information to governments, the institutions themselves, international partners and other sectors seeking to support the higher education sector especially in knowledge generation through research and doctoral training. Several indicators have been used to measure research capacity at system and institutional levels. According to Bates et al. (2011) some of the indicators that have been used to measure changes in research capacity range from process measurements such as awarding of PhD scholarships or grants, to more precise measurements such as number of PhD programmes, numbers of PhDs completed, number of publications or programmes led by the university.

This study reveals that within the last decade, there have been several initiatives and reforms to increase research productivity and opportunities for PhD training in Ghanaian universities. Despite these developments, low research productivity and inadequate numbers of staff with PhDs still characterise the system. The persistent lack of capacity and inadequate funding to promote research and PhD training remain the main challenges of doctoral studies. The absence of a national policy framework with an overarching national research agenda could have led to creating fragmentation in national research efforts.

## 2. Methodology

In line with the aims of the study to capture a cross-section of diverse higher education institution types, ten were selected for the study. The sample was drawn from all chartered public and private universities in Ghana that have been in existence for at least ten years and which offer PhD programmes. To ensure diversity, the sampling criteria included the age,

status, regional locations, numbers of PhD programmes and size of institution. These criteria yielded eight universities. However, two additional universities (one public and one private) not currently offering PhD programmes were added to the sample. This was to provide more insights into the challenges constraining such institutions from establishing PhD

programmes. This mix provided a richly diverse and representative sample of the higher education sector in Ghana. Table 1 presents profiles of the sampled universities for the study. It also includes the year of establishment, type, student population and number of PhD programmes in the universities.

**Table 1:** Profiles of the sampled universities, 2015–16

	University	Region	Ownership	Year	Type	General student population (year)	No. of PhD programmes (year)
1.	University of Ghana (UG)	Greater Accra	Public	1948	Comprehensive	37,940	64
2.	Kwame Nkrumah University of Science and Technology (KNUST)	Ashanti	Public	1952	Comprehensive	45,866	71
3.	University of Cape Coast (UCC)	Central	Public	1962	Comprehensive	35,922	35
4.	University of Education, Winneba (UEW)	Central	Public	1992	Specialised professional	51,686	22
5.	University for Development Studies (UDS)	Northern	Public	1992	Specialised Professional	18,084	14
6.	University of Mines and Technology (UMaT)	Western	Public	2004	Specialised professional	2,105	9
7.	Ghana Institute of Management and Public Administration (GIMPA)	Greater Accra	Public	1961	Specialised professional	3,383	2
8.	Akrofi-Christaller Institute of Theology, Mission and Culture (ACITMC)	Eastern	Private	1987	Specialised professional	Not reported	1
9.	University of Professional Studies, Accra (UPSA)	Greater Accra	Public	1965	Specialised professional	12,000	0
10.	Central University College (CUC)	Greater Accra	Private	1988	Specialised professional	8,470	0

Source: universities' websites and handbooks

Data collection was undertaken through different approaches. One was by desk reviews of relevant documents and publications. The documents were mainly obtained from relevant government ministries (i.e. Ministry of Education, and Ministry of Environment, Science, Technology and Innovation), regulatory bodies for tertiary education (i.e. National Council for Tertiary Education and NAB) as well as annual reports, statistics reports, factsheets and research reports from the selected institutions. The second approach was

through a questionnaire. The survey respondents were selected using convenience sampling and included alumni, heads of department, directors of research and supervisors of PhD students. The questionnaire data was supplemented by interviews with alumni and administrators responsible for doctoral provision (such as deputy vice-chancellors or registrars). In order to provide cross-sector context to the institutional data, interviews were also carried out with one representative of the ministry of education, two

university leaders, and two leaders of regulatory authorities responsible for education. The interviewees were purposively sampled. One focus group discussion was held with seven representatives of industry drawn from six sectors: manufacturing (1); finance and insurance (2); telecommunication (1); government/public services (1); mining (1) and agriculture (1). Additional secondary data was obtained from the websites of the participating universities. Table 2 presents a summary of data collection.

**Table 2:** Summary of data collection

University	Questionnaires						Interviews	
	Central university management		Deans and heads of department		Alumni		Alumni	Deputy vice-chancellors and registrars
	Sent	Valid received	Sent	Valid received	Sent	Valid received		
UG	3	0	20	13	25	16	5	1
KNUST	3	0	23	15	25	14	4	0
UCC	2	0	19	12	23	15	3	1
UEW	2	0	5	3	10	8	2	1
UDS	2	1	6	5	10	6	2	1
UMaT	2	0	6	3	6	4	1	0
GIMPA	2	1	2	1	0	0	0	0
ACITMC	2	1	1	1	3	2	1	1
UPSA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1
CUC	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1
<b>Total</b>	<b>18</b>	<b>3</b>	<b>82</b>	<b>53</b>	<b>102</b>	<b>65</b>	<b>18</b>	<b>7</b>

Note: n/a = not applicable because the university does not run a PhD programme

# 3. Availability, thematic priorities and quality of doctoral training

## 3.1 Overview of the changes in the PhD training landscape over the last decade

Over the last ten years, there have been several transformations in the higher education sector in Ghana. These include the proliferation of private university colleges, the establishment of two new public universities, governance reforms, strengthening of regulatory frameworks, growth of regional, and continental higher education policies and other reforms targeting research and knowledge production. This study is however focused on research production and PhD training in the Ghanaian higher education system. It will thus mainly discuss transformations and developments related to these areas.

Over the past ten years, there have been developments in research production and PhD training in Ghanaian universities. Alabi (2013) identified four such initiatives, which included (i) establishment of research management offices in the universities,

(ii) development of policies and capacities for managing and supporting research, (iii) identification of institutional research priorities and (iv) promotion of transparency and accountability in research. In addition to these, interviews with deputy vice-chancellors involved in this study revealed that the universities had been engaged in restructuring their PhD programmes. This included the establishment of new funding programmes for PhDs and research. Others had created centres of excellence for research which were also related to PhD programmes. There are also universities which had made investments into the acquisition of new infrastructure to support their PhD programmes and strengthen their research. In the ensuing sections, these developments are discussed in detail.

## 3.2 Growth in PhD provision and thematic priorities

As the tertiary education sector in Ghana continues to expand in response to the ever-growing demand for higher

education, there has been a corresponding increase in demand for faculty with PhD qualifications. This is in addition to demand for highly qualified specialists in other sectors of the economy. At the same time, there has been growing pressure on the universities to enhance their research outputs for utilisation in responding to the several challenges facing Ghanaian society. Consequently, within the universities, there has been an implicit requirement on academic staff to obtain PhDs, prompting those who did not have PhDs to enrol. The push effect of this move has in the recent years led to the development of new PhD programmes due to additional demand. The universities have also been reviewing old doctoral programmes and introducing new and relevant ones. By 2016 over 200 PhD programmes could be identified in Ghanaian universities compared to the less than 100 programmes that existed in 2005. The PhD programmes covered a broad range of areas, as is summarised in Table 3.

**Table 3:** PhD programmes in the sampled universities, 2016

	University	Natural sciences, engineering and technology	Humanities and social sciences	Business, economics and management sciences	Education	Total
1.	UG	37	16	8	3	64
2.	KNUST	55	4	12	0	71
3.	UCC	12	12	1	10	35
4.	UEW	0	0	0	22	22
5.	UDS	12	0	2	0	14
6.	UMaT	9	0	0	0	9
7.	GIMPA	0	0	2	0	2
8.	ACITMC	0	1	0	0	1
<b>Total</b>						<b>218</b>

According to information from the universities, the initiative to introduce new PhD programmes was mainly undertaken by the departments and faculties following approval from the respective university senates and management. In a number of instances, the main rationale for introducing PhD programmes was 'to produce the human capital needed to develop and sustain high-quality teaching and research activities in the university'. The new PhD programmes had to be

aligned to the respective missions of the universities, the overall institutional strategic plan and based on availability of qualified staff and facilities. Table 4 presents some of the key factors that were considered in establishing new PhD programmes. To a large degree, availability of adequate learning resources and research infrastructure, programme alignment to national priority development agendas and to labour market demand of the programmes were also considered.

However, the two factors that did not seem to attain much consideration in establishing the programmes was the availability of sustainable funding to support them or the role of professional associations in the establishment of the programmes. The lack of prioritisation of funding is an interesting one, as funding was one of the key challenges and barriers to research production and PhD training in Ghana.<sup>3</sup>

**Table 4:** Factors considered by deans and heads of department when introducing new PhD programmes

Factors considered	Frequency (n=53)	%
Programme alignment to the university's mission and strategic plan	44	83.02
Availability of qualified and experienced faculty	44	83.02
The needs of stakeholders (industry/business)	43	81.13
Availability of adequate learning resources and research infrastructure	36	67.92
Programme alignment to national priority development agendas	33	62.26
Labour market demand for the programme	27	50.94
Sustainability over medium to long term	24	45.28
Availability of funding	10	18.87
Professional associations	5	9.43

Source: field survey data (2016)

3. The majority of the responses (i.e. 52 out of 53) came from public universities and therefore the findings could not be analysed to show the differences, if any, between the public and private universities.

Admission into PhD programmes generally took a similar mode in all Ghanaian universities. Admission was mainly done through the respective graduate admission boards based on recommendations from departments and faculties in which the students intended to study. Across the studied institutions, there were difficulties in obtaining data regarding enrolments and graduation rates of the PhD students over the past ten years. This notwithstanding, some useful data was obtained from the NAB which generally indicated that PhD enrolments in Ghanaian universities was growing. According to the NAB (2015) between 2010 and 2013, enrolments in doctoral programmes in Ghana's public HE institutions grew at an average of 26.5 per cent. In 2010–11, the board reported that total enrolment for doctorate degrees was 715. This figure rose to 824 in 2011–12 (representing a 15.24 per cent growth rate) and 1,135 in 2012–13 (a growth rate of 37.74 per cent).

Despite this growth, enrolments into PhD programmes constituted only 0.5 per cent of the total student enrolments in the public tertiary educational institutions. While there were 824 students enrolled in PhD programmes, the undergraduate and master's students' enrolments combined stood at 226,750. In 2014–15, out of a total enrolment of 147,180 students in the public universities, only 0.9 per cent were enrolled in PhD programmes. The UMaT had the highest percentage of 1.4 per cent followed by the UG with 1.1 per cent of total enrolled students. For the private universities that presented statistics to the NCTE<sup>4</sup> in 2014, none of them had a PhD programme and thus did not have registered PhD students.

A more detailed picture of enrolments in relation to graduations is available for the nation's six oldest universities. The NCTE further reported that for 2012–13, only 65 students graduated with doctoral degrees out of a total

of 42,246 graduating students from KNUST, UCC, UDS, UEW, UG and UMaT. This figure represents 0.15 per cent of the graduating students and an average of 11 PhDs per university. Meanwhile, the total enrolment of PhD students for that year was 963 with the UG having the highest enrolment figure and UMaT the least (see Table 5). Of the 65 PhDs that were graduated in 2012–13, the UG and KNUST graduated more than 70 per cent of them, with 32 and 15 PhDs respectively (see Table 5). The UG, which has the highest rate of PhD production in Ghana, has produced 81 PhDs between 2005 and 2010 – an average of about 16 PhDs per annum. With only 65 PhDs produced by the system annually, amid the expanding higher education sector, dwindling research productivity and the challenges facing PhD training, it is clear that deliberate and concerted efforts are needed to address the situation.

**Table 5:** PhD enrolments and graduation rates from the sampled public universities, 2012–13

Institution	PhD enrolment	PhD graduation
KNUST	228	15
UCC	164	9
UDS	88	4
UEW	155	4
UG	302	32
UMaT	26	1
<b>Total</b>	<b>963</b>	<b>65</b>

Source: NCTE (2014)

4. The NCTE is the supervisory body for tertiary education in Ghana.

### 3.3 Capacity of existing PhD programmes

It was also important to undertake an analysis of the capacities of the existing PhD programmes. The approach taken was to look into the quality of the academic staff in these programmes and departments and the available facilities to support the training. It was notable from the sampled universities that though efforts had been made to improve the quality of staff and training facilities, the capacities within the departments were still inadequate. For instance, looking at the ranks of academic staff in the sampled Ghanaian universities (see Table 6) and also corroborated

by the outcomes of the interviews with the university leaders and heads of the academic departments, there were still very few staff with PhD qualifications across the institutions. As per the NAB's requirements, the minimum qualification required for teaching at the degree and tertiary level in Ghana is a researched master's degree.<sup>5</sup> Thus, most of the staff in the universities had a master's as their highest academic qualification. This is demonstrated in Table 6, in which the majority of staff are lecturers (master's qualifications) while very few are at the level of senior lecturer or professor where PhD qualification is a requirement. As Table 6 depicts, only about 30 per cent of the staff had PhDs with some of them

located in departments which did not offer PhD programmes. This suggests that the staff with PhDs were very thinly spread in the departments offering PhD training. The proportion of faculty trained to PhD level is critical for quality training of PhDs and strengthening research capacity and productivity. As is depicted in Table 7, for the 2012–13 academic year, the proportion of academic staff in Ghanaian public universities with PhDs ranged between 18.1 per cent to 49.1 per cent. This excludes data from KNUST and UCC, which was unavailable (NCTE, 2014). With the increasing PhD enrolments this already-stretched capacity will struggle to cope with the growing demand.

**Table 6:** Distribution of academic staff in the public universities sampled, 2013–14

Institution	Professor/associate professor	Senior lecturer	Lecturer	Assistant lecturer	Tutor	Total
KNUST	89	178	447	86	0	800
UCC	78	143	283	120	0	624
UDS	19	65	345	68	0	497
UEW	44	80	310	15	0	449
UG	174	241	405	193	32	1,045
UMaT	10	17	44	17	0	88
UPSA	4	2	84	51	0	141
<b>Total</b>	<b>418</b>	<b>726</b>	<b>1,918</b>	<b>550</b>	<b>32</b>	<b>3,644</b>

Source: Ministry of Education (2017)

5. The NAB's decision on this minimum requirement can be found at: [www.nab.gov.gh/board/board-decisions](http://www.nab.gov.gh/board/board-decisions)

**Table 7:** Academic staff qualification, 2012–13

Institution	Qualification	Male	Female	Total	%
KNUST	Not available	Not available	Not available	Not available	Not available
UCC	Not available	Not available	Not available	Not available	Not available
UDS	PhD	113	-	113	25
	MPhil	120	5	125	27
	Master's	217	5	222	48
	Degree/others	-	-	-	0
	<b>Total</b>	<b>450</b>	<b>10</b>	<b>460</b>	<b>100</b>
UEW	PhD	81	8	89	25.6
	MPhil <sup>6</sup>	93	36	129	37.1
	Master's	93	35	128	36.8
	Degree/others	2	-	2	0.5
	Total	269	79	348	100
UG	PhD	369	84	453	49.1
	MPhil	197	92	289	31.3
	Master's	98	40	138	15.0
	Degree/others	30	13	43	4.6
	<b>Total</b>	<b>694</b>	<b>229</b>	<b>923</b>	<b>100</b>
UMaT	PhD	15	-	15	18.1
	MPhil	22	3	25	30.1
	Master's	38	5	43	51.8
	Degree/others	-	-	-	0
	<b>Total</b>	<b>75</b>	<b>8</b>	<b>83</b>	<b>100</b>

Source: NCTE (2014)

6. The MPhil in Ghana is a two-year researched master's degree aimed at preparing students to be able to conduct good research. Students spend the second year writing a thesis under supervision which is normally examined externally.

It is in recognition of this capacity challenge that NAB encourages academic staff in the universities to have a PhD qualification, but only actually requires a researched master's degree or MPhil. NCTE's norm for academic staff in public tertiary institutions states that 25 per cent of the academic staff should be professors/associate professors, 30 per cent senior lecturers and 45 per cent lecturers. For most of the public universities now, holding a PhD is a requirement for promotion to a senior lecturer position.

From the interviews with the universities that are yet to introduce PhD programmes, it also emerged that the main constraint they face in the

attempt to introduce PhD programmes was the lack of qualified staff for teaching and supervision of the doctoral students. Due to these constraints, they cannot be granted approvals to offer doctoral programmes. This situation is similar in most of the private universities.

### 3.4 Quality of PhD programmes: perspectives of academic departments and alumni

While quality is crucial in PhD training, assessing the quality of PhD programmes can be a complex task since there is no single precise way of

doing so. To evaluate the quality of PhD programmes in this study, the questionnaires to the deans and heads of departments examined the availability of policies put in place to ensure several aspects of quality, and the extent to which the policies were rated as effective or not. The statements on institutional policies to ensure quality PhD programmes were presented to the heads of departments and alumni on a Likert scale ranging from 1 'Not effective' to 4 'Very effective', with 0 indicating 'Not available'. The outcomes are presented in Table 8.

**Table 8:** Policies for quality of PhD programmes according to deans and heads of department

Policy	Mean	Standard deviation	Likert-scale responses (%) n=53				
			Not available	Not effective	Somewhat effective	Effective	Very effective
Admission regulations and procedures for PhD students	3.66	0.55	0.00	0.00	3.77	26.42	69.81
Institutional accreditation related to PhD	3.54	0.61	0.00	0.00	5.66	33.96	60.38
Programme accreditation related to PhD	3.53	0.64	0.00	0.00	7.55	32.08	60.38
Policies and procedures for supervision of PhD students	3.40	0.66	0.00	0.00	9.43	41.51	49.06
Regulations and procedures for thesis examination	3.36	1.02	0.00	5.66	5.66	30.19	58.49
Institutional system for evaluating the organisation and quality of PhD supervision	3.21	0.77	0.00	0.00	20.75	37.74	41.51
Systems and procedures for evaluating quality of teaching and learning related to PhD programmes	3.13	0.90	0.00	5.66	16.98	35.85	41.51
Systems and procedures for monitoring the progress of PhD students	3.04	0.76	0.00	1.89	20.75	49.06	28.30
Systems and procedures for assessing quantity and quality of research related to PhD	3.00	1.09	3.77	7.55	13.21	35.85	39.62

**Table 8** continued

Policy	Mean	Standard deviation	Likert-scale responses (%) n=53				
			Not available	Not effective	Somewhat effective	Effective	Very effective
Structures to co-ordinate and manage PhD programmes	2.91	0.84	0.00	5.66	22.64	47.17	24.53
Institutional system for periodic review of PhD programmes	2.79	0.97	3.77	3.77	24.53	45.28	22.64
Systems to promote a stimulating research and working environment for PhD students	2.43	0.91	3.77	5.66	45.28	33.96	11.00
Structures to facilitate partnership with industry and business sector related to PhD training	2.19	1.06	0.00	32.08	32.08	20.75	15.09
Institutional system and mechanisms for funding PhD research	2.09	1.16	7.55	26.42	28.30	24.53	13.21

Source: field survey data (2016)

As is depicted in Table 8, most of the responses were rated 2 and above with average scores higher than 3. This indicates that in the departments or universities where PhD quality policies exist, they were thought to be generally effective. From the results, there are five areas (the last five items in the table) that were rated less than 3, suggesting that they require improvement. Such areas include 'systems and procedures for assessing quantity and quality of research related to PhD' and 'systems to promote a stimulating research and working environment for PhD students'. Furthermore, there were cases where certain policies were not available suggesting a need for interventions with relevant policies. These policies include having 'systems and procedures for assessing quantity and quality of research related to PhD', 'institutional system and mechanisms for funding PhD research', 'institutional system for periodic review of PhD programmes'

and 'systems to promote a stimulating research and working environment for PhD students'. Standard deviation is a measure of variability in responses given. The responses 'admission regulations and procedures for PhD students' had the least variation with a standard deviation of 0.55, while responses to 'institutional system and mechanisms for funding PhD research' had the most variation with a standard deviation of 1.16, indicating that there is variation in systematic funding mechanisms at Ghanaian universities.

The quality of the PhD programmes was also evaluated based on the responses from the alumni who had just graduated from these programmes. The responses as presented in Table 9 indicate that the alumni felt that the PhD training was generally of reasonable quality as it enabled them to develop research skills in their fields of training. They

however reported to have missed some important skills such as developing research proposals, working collaboratively with interdisciplinary and multidisciplinary teams, teaching skills and skills for advising postgraduate students. The alumni also gave their perception of the quality and adequacy of resources including library facilities and services; electronic learning resources; research infrastructure; specialized equipment, computers; web-based campus computer services; working space or office for PhD students, career development support; and intellectual environment of the departments where they studied. Table 9 provides the responses of the alumni on the availability and quality of resources that were available during their doctoral training.

**Table 9:** Evaluation of PhD resources by doctoral alumni

Resources	Adequacy (%) n=65			Quality (%) n=65		
	2	1	0	a	b	c
Library facilities and services (study space, books, electronic journals, other references, etc.)	56.92	43.08	0.00	52.31	38.46	9.23
Electronic learning resources (computers, internet access, etc.)	36.92	56.92	6.15	24.62	50.77	24.62
Research infrastructure (labs, workshops, etc.)	32.31	50.77	16.92	29.23	47.69	23.08
Specialised equipment, computers, etc.	24.62	41.54	33.85	21.54	38.46	40.00
Web-based campus computer services	24.62	52.31	23.08	27.69	41.54	30.77
Working space (office) for PhD students	9.23	32.31	58.46	6.15	21.54	72.31
Career development support	12.31	50.77	36.92	9.23	23.08	67.69
Intellectual environment of your department	35.38	64.62	0.00	43.08	50.77	6.15

Source: field survey data (2016)

Note: 0 = Unavailable; 1 = Inadequate; 2 = Adequate; a = Good; b = Satisfactory; c = Poor

Based on the outcomes presented in Table 9, apart from library facilities which were found to be adequate by a small majority of respondents (56.92 per cent), the other resources necessary for PhD training were either inadequate or unavailable. In addition to availability, a similar conclusion can be reached for the quality of the resources. Except for library facilities and services which was rated good by more than half of the respondents (52.31 per cent), the rest of resources and facilities were rated as either satisfactory or poor. In particular, the poor rating of 'working space (office) for PhD students' was striking, suggesting that measures need to be taken to address this problem. Equally, there were a number of areas where a sizeable proportion of the respondents (between 6.15 per cent and 58.46 per cent) indicated that the resources were not available. Worthy of note among these is 'working space (office) for PhD students', which requires urgent redress in order to facilitate students' research.

### 3.5 Alumni satisfaction with PhD programmes

In addition to the above aspects, the study also addressed the satisfaction of the alumni with the quality of their PhD training. On a scale of 1 (dissatisfied) to 4 (very satisfied), the average responses to most of the questions ranged between 3 and 4 indicating satisfied or very satisfied. 'The overall content learning during your PhD study' and 'your overall experience as a PhD student' were rated at 3.43 and 3.49 respectively (see Table 10). Based on the mean scores, the top three aspects of PhD study in which the alumni were most satisfied were 'competence and experience of your research supervisor(s)' (mean of 3.91), 'relevance of your dissertation topic to your field of study' (mean 3.89) and 'professional relationship with your supervisor' (mean 3.83). These outcomes suggest that the alumni were very satisfied with the capacities of their supervisors and their professional relationships. In addition, they

expressed satisfaction with the quality of their work by rating 'quality of your research work' at a mean of 3.71. It is also important to note from Table 10 that the respondents evaluated 'relevance of your research work to national research priority agendas/industry' as 3.55, suggesting that they were very satisfied with the extent to which their research fitted into the national-level research priority agendas and industry needs.

**Table 10:** Alumni satisfaction with PhD study

Item	Mean	Standard deviation	Likert-scale responses (%) n=65				
			Not applicable	Dissatisfied	Somewhat dissatisfied	Satisfied	Very satisfied
The overall content learning during your PhD study	3.43	0.77	0.00	0.00	16.92	23.08	60.00
The guidance and advisement by your department	3.17	0.99	3.08	3.08	13.85	33.85	46.15
Relevance of the PhD courses offered	3.06	1.42	15.38	0.00	4.62	23.08	56.92
Overall quality of the PhD course offered	2.97	1.47	16.92	0.00	7.69	20.00	55.38
Competence and experience of your research supervisor(s)	3.91	0.29	0.00	0.00	0.00	9.23	90.77
Professional relationship with your supervisor(s)	3.83	0.75	0.00	0.00	0.00	16.92	83.08
Quality and effectiveness of research supervision	3.55	1.01	0.00	3.08	6.15	23.08	67.69
Adequacy of research facilities provided	2.93	1.31	0.00	12.31	16.92	35.38	35.38
Adequacy of financial support for your research project	2.49	1.04	6.15	23.08	16.92	23.08	30.77
Support provided in designing your research project	2.91	0.31	3.08	9.23	12.31	44.62	30.77
Relevance of your dissertation topic to your field of study	3.89	0.45	0.00	0.00	0.00	10.77	89.23
Relevance of your PhD training for your professional development	3.72	0.79	0.00	0.00	0.00	27.69	72.31
Relevance of your research work to national research priority agendas/ industry	3.55	0.46	3.08	0.00	0.00	32.31	64.62
Quality of your research work	3.71	1.20	0.00	0.00	0.00	29.23	70.77

**Table 10** continued

Item	Mean	Standard deviation	Likert-scale responses (%) n=65				
			Not applicable	Dissatisfied	Somewhat dissatisfied	Satisfied	Very satisfied
Your participation in national conferences	2.51	1.25	9.23	6.15	33.85	26.15	24.62
Your participation in international conferences	2.73	1.25	6.15	12.31	20.00	24.62	36.92
Intellectual environment of your department	3.28	0.80	0.00	3.08	12.31	38.46	46.15
The overall working environment	3.20	0.86	0.00	3.08	20.00	30.77	46.15
Your overall experience as a PhD student	3.49	0.73	0.00	0.00	13.85	23.08	63.08

Source: field survey data (2016)

Note: 1 = Dissatisfied; 2 = somewhat dissatisfied; 3 = Satisfied; 4 = Very satisfied; 0 = Not applicable

Conversely, the results in Table 10 also reveal aspects of the PhD training that the respondents were least satisfied with. One of these include 'adequacy of financial support for your research project' (mean of 2.49), 'your participation in national conferences' (mean of 2.51), and 'your participation in international conferences' (mean of 2.73). With these findings, the areas for policy interventions are manifest.

Financial support for research and other requirements by PhD students such as support for participation in conferences and capacity-building workshops could enhance their satisfaction with their PhD studies. These kinds of support could provide them with exposure to other academic resources and relevant academic communities. This could enhance their capacities and contribute immensely

to their academic growth, especially for those who want to be become academics, as they are given a platform to publicly present their work, and engage with peers and other scholars. Such training can result in well-rounded and developed graduates ready to enter the world of academia.

## 4. The national-level research agenda and doctoral training

### 4.1 Defining a national research agenda

There are several advantages to be derived from having a research policy or framework that can guide the conduct of research at the national level. One advantage is that it helps set the national-level agenda for research and the priority areas to be pursued by national research-oriented institutions. It also provides a mechanism for ensuring that the research agenda and priorities address the national vision. Such policies would also have modalities for aligning research efforts at all levels (institutional, regional and national) to this agenda. According to Benneh (2002) and Cisse (2001) the lack of national research agenda has resulted into the fragmentation of national research efforts in many African countries, including Ghana. This study noted that Ghana is yet to establish a national research policy that could address these challenges to research and PhD training among others. However, in November 2017, the Cabinet voted \$50 million as seed money for the establishment of the National Research Fund. It is not yet clear if the fund will identify some priority areas for research and improve on resource allocation to research-based institutions and researchers including doctoral students.

The outcome of the interviews with the university leaders indicated that it was still contentious if a national-level research agenda or policy was necessary in Ghana. One of the vice-chancellors expressed the view that *'we sincerely need to have a national research agenda that outlines what we*

*need to focus our research on, how much we want to invest in research and the funding sources'*, while another vice-chancellor expressed a contrary view. Another was of the view that *'It is not possible to have a national research agenda, because research is supposed to answer questions and there are many questions. So, you can't have a national research agenda but rather you should have a national interest or enthusiasm for research. You should have an environment that is supportive of research'*.

In the absence of a national-level research agenda or policy, Ghana, like many other African countries, has had a series of national plans and programmes that are expected to give direction to research institutions about governments' priority areas. These national plans, albeit not explicitly, provide some pointers to what could be regarded as national-level research agenda. Since independence, eight such plans have been developed in Ghana (NDPC, 2016). They include the Second Five-Year Plan (1959–64), Seven-Year Development Plan for National Reconstruction and Development (1963–64 to 1969–70), Operation Feed Yourself and Operation Feed Your Industries, Economic Recovery Programme (ERP I: 1983–86 and ERP II: 1987–92), Vision 2020: First Step (1996–2000), Ghana Poverty Reduction Strategy (GPRS I: 2003–05), Growth and Poverty Reduction Strategy (GPRS II: 2006–09), Ghana Shared Growth and Development Agenda I (GSDA I: 2010–13) and Ghana Shared Growth and Development Agenda II (GSDA II: 2014–17).

A closer examination of the planning documents relating to the millennium years point to some national priorities that should have been important in driving the national research agenda. The areas of priority in the 2003–09 documents (i.e. GPRS I and II) were: enhanced infrastructure development, rural development based on modernised agriculture, enhanced social services, good governance and private sector development. However, in the 2010–17 planning documents (i.e. GSDA I and II) the priorities were: ensuring and sustaining macroeconomic stability; enhanced competitiveness of Ghana's private sector; accelerated agricultural modernisation and natural resource management; oil and gas development; infrastructure, energy and human settlements development; human development, employment and productivity; transparent and accountable governance, social development; economic development; infrastructure development; natural resource management and environmental governance; and transparent, responsive and accountable governance. The extent to which institutional-level research has been able to address these national-level agendas is yet to be examined.

In almost all recent planning documents, the government has prioritised science, technology and innovation. This has culminated into the development of a National Science, Technology and Innovation Policy (Ministry of Environment, Science and Technology, 2010). The principal thrust of this policy is to harness the nation's science and technology capacity to

drive all the sectors of the Ghanaian economy. One key objective of the policy is to strengthen the appropriate institutional framework to promote the development of scientific and technological research. Within this objective, the policy provides for other sectoral policies in agriculture, health, education, environment, energy, trade, industry, natural resources management, human settlements and communication that seek to drive the national science, technology and innovation policy agenda.

Beyond 2016, Ghana is seeking to shift from the medium-term plans to long-term national development plans. The view is that ‘the medium-term frameworks and their medium-term plans, developed by the central government and their district assemblies respectively, have not served Ghana well, hence the call for a long-term national plan’ (NDPC, 2016: 39). In response to this view, the NDPC is leading the efforts to develop a 40-year development plan for Ghana (2018–57) that will address the following goals derived from the Directive Principles of State Policy:

- i). Build an inclusive and resilient economy (economy)
- ii). Build an equitable and tolerant society (society)
- iii). Build safe and sustainable communities (environment – built and natural)
- iv). Build effective and efficient institutions (governance/institutions across society)
- v). Promote world peace and justice (global context of national development).

So far, the draft framework for this long-term plan recognises that, for the plan to propel the transformation agenda, there will be the need for human capital development, public sector reform/modernisation, land reforms, infrastructural development with immediate priority on energy, science, technology and innovation, and attitudinal change. Committed to the full implementation of global and regional agendas, the NDPC has indicated that, just like the Millennium Development Goals, the Sustainable Development Goals (SDGs) are at the centre of government’s development discourse, and therefore it was anchoring the first 15 years of the 40-year development plan to the SDGs.<sup>7</sup>

#### 4.2 Alignment of institutional-level research priorities to the national agenda

The acts or laws establishing public universities in Ghana empower them to set their own priorities for academic programmes, curriculum content and structure, teaching philosophy and research agenda. In most cases, the universities determine their research agenda and priority areas. These are aligned to their visions and missions, societal problems, availability of funding, and the critical mass needed to sustain the university enterprise. In the pursuit of these important aspects, Ghanaian universities have established departments, research institutes and centres to spearhead research in their priority areas in addition to introducing PhD programmes to develop needed expertise for research. Based on the focus areas of the research centres,

institutes and PhD programmes in Ghanaian universities makes it rather difficult to come out with a comprehensive list of the research prioritisation. However, judging from the over 200 PhD research programmes that are currently run by the selected universities, it can be noted that the priority areas of research in the Ghanaian universities are vast and evolving. Indeed, they cover broad areas such as engineering and technology, agriculture and life sciences, medicine and health sciences, business and economics as well as social sciences and humanities. These are all linked to some of the priority areas identified in the 2010–17 strategy documents.

With there being no national research policy in Ghana, it is hard to evaluate the alignment of institutional research agendas to the national-level agenda. It is, however, not unreasonable to expect that insofar as research in the public universities is not funded by governments but through contracts from donor partners and organisations, it may not necessarily meet some of the aspirations of the nation and some key stakeholders, such as industry.

#### 4.3 National-level support systems for promoting the national research agenda

Even though there is no single institution in Ghana with a specific mandate to regulate research, the NCTE and NAB both contribute to the regulation of the tertiary education sector in general and its research activities. Apart from the public universities that are expected to promote research, there are also

7. Progress towards the attainment of the Millennium Development Goals has been recorded since 2002 in Annual Progress Reports on the implementation of Ghana’s medium-term development frameworks, namely, the GPRS I and II and the GSGDA I and II.

some research units within government ministries, departments and agencies that are equally expected to pursue research agendas that cascade into the national-level research agenda. In addition, the government has created other public research institutions to drive the agenda, including the National Development Planning Commission (NDPC), the Council for Science and Industrial Research (CSIR), the Ghana Atomic Energy Commission, Environmental Protection Agency, and Town and Country Planning Department. Of interest in national policy planning is

the NDPC, which was established in 1992 to advise the president on development planning policy and strategy. It also studies and makes strategic analyses of macro-economic and structural reforms for the development of the country (NDPC, 2016: 5).

The CSIR, on the other hand, is responsible for the implementation of government policies on scientific research and development, and advises the minister on scientific and technological advances likely to be of importance to national development (CSIR Act, pp. III-1252: III-1253).

The CSIR is composed of 13 Research Institutes each with a specific mandate to develop and utilise innovative technologies in research and development activities. The research institutes cover the broad areas of agriculture, industry, agro-processing, fisheries, forestry, water resources, building and construction, environment, health, natural and social sciences. They are complementary to research activities of universities and thus in a way support PhD training. It is therefore important for universities to collaborate with these institutes to enhance existing capacities for PhD training.

## 5. Engagement with industry, the private sector and social challenges

Given the autonomy that Ghanaian universities have to determine their research priorities, different universities have adopted different approaches or strategies to shape their focal research areas. At one end of the spectrum, there are universities that apply the bottom-up approach; and, at the other end, there are those that apply the top-down approach. In KNUST for example, it is reported that individual researchers and departments set their own research agenda which should fit into the university's vision and objectives (Alabi, 2013). However, at the UG, it was noted that research priorities are identified by the faculty in alignment with the university's strategic priorities (*ibid.*). After adopting the collegiate system in 2014, the governance structure at the UG is supposed to be decentralised, suggesting that colleges within the institution are supposed to be semi-autonomous and should be able to take more decisions on their own regarding academic programmes and research focus.

In line with its vision of becoming a research-intensive university and to reflect developments in research and development systems around the world, the UG introduced a new structure for its PhD programmes starting from the 2012–13 academic year. A major strand of the restructuring was to make the PhD a four-year programme and doctoral

programmes conform to acceptable best practices. These included one year of compulsory coursework, one year of research training and attachment to research projects, and two years of independent research and thesis writing. The university also introduced doctoral schools to improve PhD delivery. These special schools, which have been opened to PhD students in other universities throughout Africa, focus on specific skills training and provide in-depth treatment of select topics such as the doctoral environment, the architecture of supervision, grants, fellowships, conferences and publication.

Research in Ghanaian universities has been traditionally focused on basic research while the private research institutions have focused on applied and action research (Manuh et al., 2007; Benneh, 2002). This situation has been attributed to the research orientations of the different institutions. While non-university research centres (such as CSIR) may be regarding research as critical in addressing the core mandates or disciplinary fields of these centres, most of university research is geared towards academic pursuits such as publications or promotion of academic staff to next cadres. In very rare cases are outcomes of university research translated to useful solutions to external stakeholders.

This trend is, however, changing, as there is increasing emphasis on applied research by Ghanaian universities. This development has been attributed to a number of factors including the severe cutback in government spending on research, growing links between universities and industries, research collaborations between universities, and the emergence of policy institutes or centres within the universities (Manuh et al., 2007; Benneh, 2002). This development is also escalated by the growing expectation on university research to respond to growing societal challenges. They are, however, still expected to conduct basic research, cutting-edge research to address local challenges and also not to lose focus on research that reflects the regional and international agendas by the African Union (Agenda 2063<sup>8</sup>) and UN (SDGs) respectively. These agendas require research to assess, monitor and track Ghana's progress toward achieving them. As one of the interviewees explained:

*'The SDGs present a golden opportunity for universities to demonstrate their capacity and commitment to the promotion of national and global sustainable development. The goals span over a range of areas including poverty, energy, climate, peace, growth, health, water and sanitation, industry and innovation, and education. And, all*

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8. The Agenda 2063 is global strategy by the African Union to optimise the use of Africa's resources for the benefits of all Africans.

*of these areas ought to be of national interest to Ghana under which our universities can make significant positive contributions through research, community engagement, advisory services or teaching.'*

The focus group discussions with key industry representatives underscored the fact that links between the universities and industry were quite weak. As one of the respondents put it, *'the Ghanaian universities are more or less like ivory towers, where a lot of the researchers simply conduct research to advance their career but not to address any practical problem'*. This situation, in the respondents' view, has contributed to the weak engagements and interactions between the universities and the industries. The representatives of industry also took blame in the fact that they had also not fully done their part in engaging with the universities. They acknowledged the complementary roles that universities and industries could have if they worked together. The industry representatives expected that the universities could also conduct more problem-solving type of research which addresses the challenges of the world of business and which could unveil opportunities for industry to get more involved in supporting university research, offering research

opportunities for students, making their laboratories and facilities available and even advising students.

To ensure that the outcomes of research by Ghanaian universities benefit industry, the respondents made several recommendations. First, they suggested that university–industry links should be seen as a two-way stream – *'It is about working together and that working together is not as strong as it should be'*. They proposed that *'industry should be speaking to university researchers, and, the academics and PhD researchers should also be speaking to industry'*. Second, universities must be prepared to spend part of their internally generated funds to support research and their institutional engagements with the industry to enable them develop mutual partnerships and collaborations. There was also strong recommendation to university leadership to put more efforts and commitment in reaching out to industry and other societal partners to create mutually beneficial links. Such links could also support the establishment of technology and knowledge transfer frameworks for university–industry partnerships. There was also the challenge for universities to create platforms for disseminating their relevant research outcomes to industry and other stakeholders

rather than just publishing them in academic journals which are less accessible to these other stakeholders. Briefing sessions such as symposia with industry and other stakeholders were viewed as crucial in these engagements. Though the industry and private sector is not that big in Ghana, it was noted that Ghanaian universities have not made much effort to co-operate with these sectors to promote research and other areas in which they could have joint efforts. This is an area in which more could still be pursued.

# 6. Funding sources to develop and sustain PhD training

## 6.1 National and international sources of funding

Funding is one of the major constraints to research and PhD production in Ghanaian universities; currently they depend mainly on government funding for their research activities. As has been discussed earlier, government funding to research has been insufficient, leading to serious challenges to the universities and even to PhD students. The universities also receive their research budget allocation from the government through the NCTE. As far as the budgetary allocations to universities are concerned, there is no fixed amount that is allocated to all universities. According to Newman and Duwiejua (n.d.), the amount of money allocated to the NCTE for the whole tertiary sector is decided through a combination of mechanisms involving historical funding or incrementalism, bidding and bargaining, and discretion. The NCTE in turn allocates the funds to the universities per a set of criteria that is not performance-based and diversified. The system pays little or no attention to national priorities and is also not geared toward any specified research outputs (*ibid.*). To rectify this anomaly, a new funding model that considers equity, efficiency, transparency and accountability has been proposed. It recommends that the NCTE base funding on the following categories: base grants; institutional factor grants; innovation grants; performance funding grants; and research grants. The research grants should be allocated to tertiary education institutions based on research publications, numbers of doctoral graduates and research master graduates.

It also proposes ways of supporting academic staff. In the public universities for example, academic staff receive an equal amount yearly to cover book and research allowances. In 2015, the book and research allowance stood at GHS 4,785 (equivalent to \$1,256), which in essence does not provide adequate incentives for research. There are plans to establish a national research fund to replace the book and research allowances and also to link research to the structural transformational agenda of government programmes. Apart from government funding through the NCTE, the government also set up the Ghana Education Trust Fund (GETFund),<sup>9</sup> which is a public trust set up by an Act of Parliament (2000) to provide funding to supplement the provision of education at all levels. It provides grants to tertiary institutions to train brilliant students and develop new faculty members especially for research and other academic endeavours of relevance to national development. The fund also provides financial support for the development and maintenance of essential academic facilities and infrastructure.

The 2012 and 2016 Education Sector Performance Reports by the Ministry of Education indicate that over the years 2008–15, education expenditure as a percentage of GDP was between 5.3 per cent and 7.9 per cent. A sizeable proportion of this (between 15 per cent and 25 per cent) was allocated to tertiary education. Allocation to research remained below 3 per cent. In a survey of three public universities in Ghana (i.e. UG, KNUST and UPSA), Alabi (2013) reported that 10–20 per cent of the universities' total budget was earmarked for research.

In an earlier study, Benneh (2002) had noted that government spending on research in Africa at large had declined significantly, compelling academic staff and researchers in the universities to rely on other sources to fund their research projects.

One of the alternative sources of funding that is gradually gaining prominence among some Ghanaian universities is funding from external partners and donors. At the UG, for example, for the 2014–15 academic year, external funding received by the university was \$16,826,747.29, representing 32 per cent of the total research funding for the year, which was \$52,524,883.11 (University of Ghana, 2016). The major donors towards this were the Alliance for a Green Revolution in Africa, the Bill and Melinda Gates Foundation, the Danish International Development Agency, the UK Department for International Development, the European Union, the Food and Agricultural Organization, the International Development Research Centre, the Leverhulme–Royal Society, the National Institute of Health, the United States Agency for International Development, the World Bank and the World Health Organization. Based on the interviews with the deputy vice-chancellors, these external donors also fund research projects in other Ghanaian universities. The UG also benefited from the DAAD in support of the Ghana/German Centre of Excellence in Development studies PhD programme, as cited by some of the alumni working in the university.

9. The sources of money for the fund are: a) 2.5 per cent Value Added Tax (VAT) rate; b) money allocated by parliament; c) money from investments made by the fund; d) grants, donations, gifts and other voluntary contributions; e) other monies or property that may in the manner become lawfully payable and vested in the Board of Trustees for the Fund.

## 6.2 How students finance PhD studies

Generally, apart from government funding to the universities, students registered on PhD programmes in

Ghanaian universities are mainly self-funding. Government support to PhD students is mainly through bursaries and grants for thesis writing. For the 2014–15 academic year, the bursary funds allocated to PhD students was

GHS 400 (equivalent to \$105) while the thesis/dissertation grant was GHS 1,100 (equivalent to \$288). Table 11 shows the other possible sources of funding for PhD studies and how they were ranked by the respondents.

**Table 11:** Major sources of financial support for PhD studies according to alumni<sup>10</sup>

Source	Received funding	1st	2nd	3rd	4th
Federal government	65	-	85	12	3
Regional government	0	-	-	-	-
The university	32	94	6	-	-
Your employer	8	75	-	25	-
Industry/business sector	0	-	-	-	-
International donors	27	26	22	52	-
Local donors	4	100	-	-	-
Self-sponsored	63	38	6	25	30

Source: field survey data (2016); n=65

Just under half the students received some financial support from their university, and most of these reported that this was their main (most important) source of funding (94 per cent ranked it as 1st, six per cent ranked it as 2nd). Just under half the students also reported receiving funding from international donors, although it more often constitutes a third, alternative source of funding (52 per cent), rather than the primary source (26 per cent). All the students received federal government funding, although for these students it was never the primary source of income, indicating that it serves to complement other major sources of funding (e.g. universities and international donors). Almost all the students reported self-funding their studies at least in part.

Compared to the actual cost associated with the processes of research and thesis production, the amounts paid to the doctoral students is severely inadequate. This compels them to explore other ways of supporting their training. In some cases, they have relied on foreign grants and the Scholarship Secretariat of Ghana for support. In other cases, students have resorted to engaging in different forms of employment, especially part-time teaching to augment the funds for their studies. Though several options such as international research grants and possibilities through links and collaborations could make a difference to the funding of PhD studies, not so much has been done in this regard by most Ghanaian universities. So far, it is only the UG that has attempted

this through its Accelerated *PhD Training* through University of Ghana – Diaspora Linkages (APT-Ghana). This initiative, according to the vice-chancellor of the UG, is funded by the Carnegie Corporation of New York and supports the establishment of the University of Ghana Pan-African Doctoral Academy to enhance PhD output; the expansion and institutionalisation of the University of Ghana Diaspora Linkage Programme to support postgraduate programme delivery and the development and delivery of new PhD programmes.

10. Eighty per cent of the alumni completed their PhD studies between 2013 and 2015.

## 7. Role of international collaborations in building research capacity

International collaborations have a significant role to play in building research capacity in Ghana. Through such collaborations universities are able to develop their institutional capacities for research and PhD training. Such collaborations also provide useful possibilities for universities to share expertise and specialised research facilities which can be transformative in developing PhD programmes and facilitating PhD training. Over the years, Ghanaian universities have benefited from international collaborations. In this too, the UG has taken the lead by having several collaborative programmes with universities from other parts of the world. Some of these are dedicated to supporting research and PhD training.

According to the dean of international programmes at the UG, the Carnegie Corporation of New York has been supporting their Next Generation of African Academics programme, which grants scholarships to PhD students, strengthens PhD programmes, trains supervisors and mentors of PhD

students, and organises seminars and workshops aimed at improving the quality of research. The target disciplines are Computational Sciences, Social Sciences and Biosphere Sciences. The University of Ghana Diaspora Linkage Programme, which was established in 2011, promotes partnerships with African professors in the diaspora to enhance the university's PhD training capacities. It includes short visits, teaching and co-supervision of PhD students. It was also reported that the UG had acquired a \$650,000 grant to support the establishment of the University of Ghana Pan-African Doctoral Academy aimed at developing new PhD programmes to support the university in becoming a regional hub for PhD training and attract excellent PhD candidates. The university is also part of the Cambridge–Africa Partnership for Research Excellence, which awards scholarships, develops new training and research models and has opportunities for post-doctoral fellowships.

From the interview data, it was notable that most of the collaborations were mainly North–South with very few South–South collaborations. One of the examples of South–South collaborations was the African Economic Research Consortium's Collaborative PhD Programme supported by the African Capacity Building Foundation and the World Bank. Even with these developments, the respondent from the International Office noted that they still faced challenges of low supervisory capacity, limited graduate accommodation, disruptions to the academic calendar and lack of demand for PhD programmes.

## 8. Conclusion

Like many other African countries, universities in Ghana continue to dominate the research landscape in terms of research outputs within the country. This has been possible not only because research capacities are concentrated in the universities, but also based on the mandate of universities to conduct research and train researchers through masters and PhD programmes. To support Ghanaian universities to increase their research outputs and relevance to industry and national-level research agenda, this study has investigated PhD capacities and research systems in Ghanaian universities with a goal of providing answers to some critical questions that can be used by donor institutions, governments and businesses looking for opportunities to support and develop the research capacity and capability in these institutions and to promote sustainable knowledge production and applications in Sub-Saharan Africa at large. The findings are summarised as follows.

First, the findings showed that within the last decade, there have been several initiatives and reforms to increase the availability, quality and thematic priorities of PhD programmes as well as research outputs of universities in Ghana. These initiatives included the restructuring of existing PhD programmes and the introduction of new ones, the establishment of research management offices and provision of small grants. The combined effects of these initiatives and reforms have yielded marginal increases in PhD enrolments and completion rates, albeit far below other African countries such as South Africa. Some of the chartered universities are yet to introduce PhD programmes and their major challenge has been the lack of technical and professional capacity.

The analysis of the qualifications of academic staff in the public universities in Ghana indicates that the country's public universities lack the requisite capacity and capability to produce adequate numbers of PhDs for the higher education sector. The existing capacity is far from ideal, especially when compared to the prevailing situations in other countries and the ever-growing demand for PhD holders. The interviews with the old universities corroborated this point, and for the relatively new universities that are yet to introduce PhD programmes, the lack of qualified experienced lecturers to teach and supervise doctoral students was even more binding and prohibitive. In recognition of these challenges, the NAB considers it too high to set PhD as the minimum standard for teaching in Ghanaian universities. However, as Ghanaian universities build capacities and train more PhD graduates, the board will raise the minimum standard for teaching in Ghanaian universities to a doctoral degree.

Second, the responses to the questions on quality of PhD programmes and availability of resources pointed to the fact that in some universities certain quality-assurance policies were not available. These policies involved 'systems and procedures for assessing quantity and quality of research related to PhD', 'institutional system and mechanisms for funding PhD research', 'institutional system for periodic review of PhD programmes' and 'systems to promote a stimulating research and working environment for PhD students'. Effective supervision and mentoring were also mentioned by the majority of the interviewed alumni as enablers for the successful completion of their PhD programmes within recommended periods. However, these enablers together with library facilities (such

as study space, books, electronic journals and other reference materials), internet, workstations and career development support were reported to be inadequate and in some cases unavailable.

Third, the study showed that although Ghana might be said to have a national-level research agenda, implied from various medium-term national policy and strategy documents, this agenda has not been contained in a single document and therefore has the tendency to create fragmentation in national research efforts. Also, it is noted that due to the lack of a documented national-level research agenda it is hard to determine if institutional-level research efforts are aligned with the national-level research priorities. The Report of the President's Committee on Review of Education Reforms in Ghana acknowledged this problem and observed that the overall research output of Ghanaian universities has been low with relatively little impact on national development. The report made several recommendations which are yet to be implemented.

However, it should be noted that the opinions of university leaders were divided as to whether a national-level agenda is even necessary. For that reason, the issue of having a documented national-level research agenda ought to be investigated further, and if it is found out that a national-level research agenda is needed, then the other logical questions to be addressed must include: who should champion it? How should it be developed? What should be the focal areas?

Fourth, there was consensus among industry professionals that the links between Ghanaian universities and industry were weak, contributing to the low impact of universities' research on society. To ensure that Ghanaian universities' research is more beneficial to society and responsive to industry needs, the respondents made a number of recommendations. They expressed the view that Ghanaian universities' research was in the form of basic research more than applied. While acknowledging that the universities could not do without basic research which goes to complement teaching and scholarship, they were of the view that the universities could conduct more problem-solving types of research to address societal challenges such as food security, climate change, poverty, health, education, sanitation and resource management.

Fifth, funding to support PhD training was reported to be a major challenge, an inhibitor to introducing new PhD programmes, and a hindrance to the production of more PhDs. For most of the PhD alumni interviewed, they depended largely on their personal finances to pay their tuition fees, cost of producing their theses and related costs such as data collection expenses. Thus, they could hardly have enough funds to participate in conferences and build networks. The government's support for PhD study in the form of bursaries and thesis/dissertation grants, was recognised as important but noted to be grossly inadequate (less than \$400 per annum). Also, there were limited cases of international donor support for PhD studies in Ghanaian universities. A few universities such as the UG however augmented their funding sources with funds from international partners and support from the private sector.

Finally, the findings also revealed that international collaborations and donor support have focused more on knowledge production and generation and not so much on developing capacity and capability for sustaining PhD programmes. In other words, a proportion of donor support to Ghanaian universities was noted to be geared towards funding faculty research and not supporting PhD programmes.

# 9. Recommendations

Based on the findings of this study, the following key recommendations are made:

1. Considering the challenges of availability of doctoral programmes, it is recommended that universities with limited resources seek partnerships and collaborations with other more endowed institutions to build the requisite capacity and capabilities for research and PhD training. Some of the private universities may also merge together or collaborate with other research institutions such as CSIR to bring synergy to bear on their capacities.
2. Ghana could consider investing in one or two of the public universities as hubs where most of the country's research masters and PhD programmes would be based. These universities should aim at the national norm of 25 per cent or more postgraduate enrolment with sizeable PhD programmes and enrolments.
3. To ensure quality PhD programmes and doctoral students' satisfaction with their programmes, it is recommended that the universities need to develop all such relevant policies, strengthen their research systems and build capacity for effective supervision and student mentoring. To this end, donor support in building these capacities may be warranted.
4. Although a national-level research agenda may be gleaned from national development policies, the NDPC should develop a document detailing national priority research areas to give direction to research-oriented universities. This recommendation was also proffered by the President's Committee on Review of Education Reforms in Ghana in 2003 and is yet to be implemented.
5. Universities should strengthen their links with industry to make their PhD training more responsive to industry and societal needs. This can be done by establishing functional technology and knowledge transfer units with clear modalities and policies for industry-academia partnerships, establishing research chairs and endowments and creating forums whereby the universities could engage industry on topical issues of interest and issue industry briefs on their PhD research findings.
6. As a sustainable way of supporting research, the Ghanaian government, through its agencies, should also increase its budget allocation to funding research and development. The GETFund, which has been recommended by the President's Committee on Review of Education Reforms to allocate a substantial proportion of its funds to support PhD research and improve facilities in the universities, should take steps to implement this recommendation. The universities must also be prepared to spend part of their internally generated funds to support PhD research so that when they approach industry for support, they can seek partnerships and collaborations instead of 'donor-recipient' relationship. Donors should expand their activities and provide support to funding and sustaining PhD programmes. Grants could be made available to support PhD dissertations' data collection and conference participation.
7. In relation to international collaborations and donor support, it is recommended that efforts should be channelled more into developing capacity and capability for sustaining PhD programmes. Regarding North-South collaborations, efforts must be put in place to ensure the full participation and involvement of South collaborators. These can be done by ensuring that PhD capacity-building proposals are co-developed and based on mutual interests.

In conclusion, while the findings of this study are very insightful in terms of what can be done to build sustainable capacity for PhD programmes, they do not in any way bring finality to the subject. The study has exposed many data limitations and there is a need for better data collection and reporting on research agendas and priorities, availability of PhD programmes, enrolment and graduation statistics, research outputs and impacts at both institutional and national levels.

# References

- Akyeampong, K (2007) *Educational Expansion and Access in Ghana: A Review of 50 Years of Challenge and Progress*. Available online at: [www.gov.uk/dfid-research-outputs/educational-expansion-and-access-in-ghana-a-review-of-50-years-of-challenge-and-progress](http://www.gov.uk/dfid-research-outputs/educational-expansion-and-access-in-ghana-a-review-of-50-years-of-challenge-and-progress)
- Alabi, G (2013) 'Case study on Ghana', in Jowi, JO, Obamba, M, Sehoole, C, Barifajjo, M, Oanda, O and Alabi, G (eds) *Governance of higher education, research and innovation in Ghana, Kenya and Uganda*. A Report submitted to OECD as part of the Programme on Innovation, Higher Education and Research for Development (IHERD).
- Bates, I, Phillips, R, Martin-Pepurah, R, Kibiki, G, Gaye, O, Phiri, K, Tagbor, H and Purnell, S (2011) Assessing and Strengthening African Universities' Capacity for Doctoral Programmes. *PLOS Medicine* 8/9: e1001068.
- Benneh, G (2002) *Research management in Africa. Higher Education Policy* 15/3: 249–262.
- Cisse, M (2001) Senegal: The national policy dialogue on research and technology for development. ENDA, Dakar, background report prepared for EU–ACP policy dialogue on research technology for development. Southern Workshop, Legon, Ghana, 29–31 January 2001.
- Manuh, T, Gariba, S and Budu, J (2007) *Change and transformation in Ghana's publicly funded universities. Partnership for Higher Education in Africa*.
- Ministry of Education (2013) *Education Sector Performance Report – 2012*.
- Ministry of Education (2017) *Education Sector Performance Report – 2016*.
- Ministry of Environment, Science and Technology (2010) *National Science, Technology and Innovation Policy*.
- National Accreditation Board (NAB) (2015) *Tertiary Education Statistics Report. A composite statistical report on all categories of tertiary educational institutions in Ghana for the 2012/2013 academic year*.
- National Accreditation Board (NAB) (2017) List of Accredited Tertiary Institutions as at December 31, 2017. Available online at: [www.nab.gov.gh/news1/472-accredited-institutions-and-programmes-as-at-december-31-2017](http://www.nab.gov.gh/news1/472-accredited-institutions-and-programmes-as-at-december-31-2017)
- National Council for Tertiary Education (NCTE) (2014) *Summary basic statistics on public universities – 2012/2013*.
- NDPC (2016) *Long-term national development plan for Ghana (2018–2057)*. Progress Report Presented to Parliament.
- Newman, E, and Duwiejua, M (n.d.) *Funding of higher education: models for innovative funding of higher education in Africa – the case in Ghana*.
- University of Ghana (2016) *Research Report – 2014/2015*.





# RESEARCH AND PhD CAPACITIES IN SUB-SAHARAN AFRICA: KENYA REPORT

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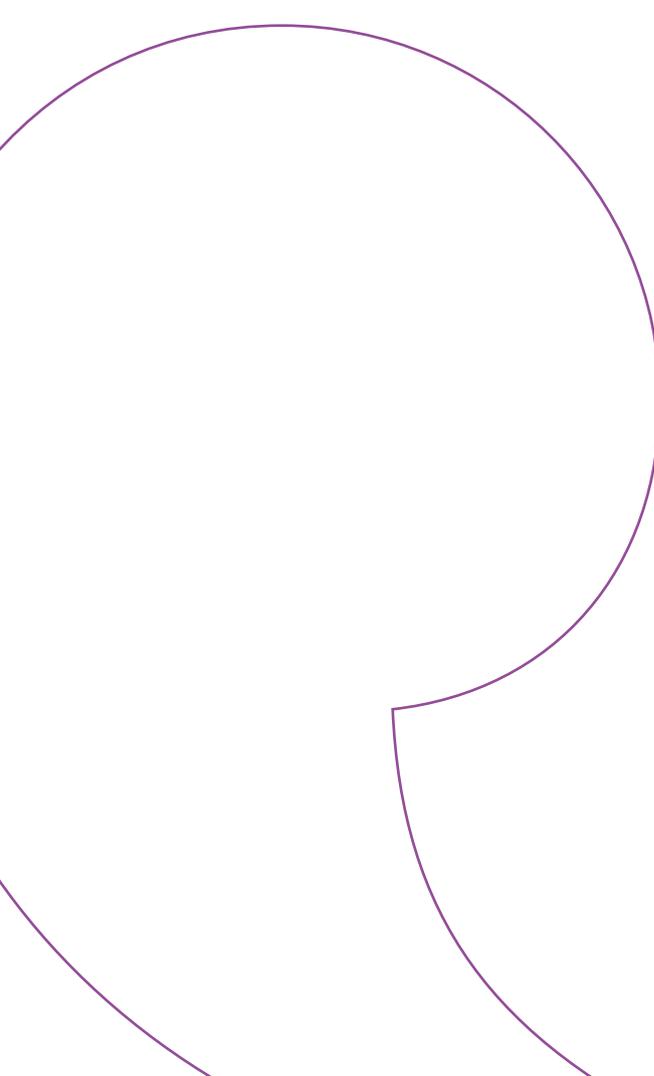
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# Foreword

**This report forms part of a broader study commissioned by the British Council and the German Academic Exchange Service (DAAD) that surveyed research and doctoral training capacity in Sub-Saharan Africa.**

The study includes six country reports, namely Ethiopia, Kenya, Ghana, Nigeria, Senegal and South Africa. This report addresses the outcomes of the study in relation to Kenya. The country reports include expanded contextualisation of the national research training landscape,<sup>1</sup> while a synthesis report is also available highlighting the key policy implications for PhD provision specifically.<sup>2</sup> The aims of the study were to investigate: (i) the availability,

quality and thematic priorities of PhD programmes and how they have changed over the last ten years; (ii) the national-level research agenda; (iii) the extent to which research training at an institutional level is aligned with the national agenda; (iv) national-level systems (policies, legislation) that facilitate alignment between institutional-level research training with the national agenda; (v) how institutional priorities reflect the needs of universities and emerging research and development systems, including local industry and societal challenges; (vi) funding sources to develop and sustain PhD provision; and (vii) the role of international collaboration in building PhD capacity.

The research, analysis, interpretations, conclusions and recommendations included in this report are those of the report authors.

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1. Country reports can be found on the British Council website <https://www.britishcouncil.org/education/ihe/knowledge-centre/developing-talent-employability/phd-capacities-sub-saharan-africa> and the DAAD website <https://www.daad.de/en/>

2. The synthesis report can be accessed on the British Council website at <https://www.britishcouncil.org/education/ihe/knowledge-centre/developing-talent-employability/phd-capacities-sub-saharan-africa> and the DAAD website <https://www.daad.de/download/phd201806>

# 1. The context of the higher education system in Kenya

## 1.1 Historical development

According to the government of Kenya, the main objective of the university was – and still is – to serve the public interest and national development initiatives. It was to achieve these by pursuing excellence in teaching, research and scholarship and thus produce well-informed, practical and holistic graduates with skills and expertise to function in the development process of the nation, both in urban and rural settings, and also acquire a critical mind, problem-solving skills, professional values and right attitudes, and be responsive to the needs of others (Republic of Kenya, 1981).

Kenya has one of the fastest-growing higher education sectors in Sub-Saharan Africa. With only one university in 1970, by 2017 there were 74 accredited universities in Kenya (31 chartered public universities, six public constituent colleges, 18 private chartered universities, five private constituent colleges and 14 institutions with letters of interim authority) (CUE, November 2017). Student enrolment grew from 112,229 (68,345 male and 43,884 female) in 2006 to 539,749 (317,280 male and 222,469 female) in 2015–16. The government has invested in the growth of the higher education sector under the pressure of fast-growing numbers of secondary school leavers and in line with national development priorities which aim to create a middle-income economy and a knowledge society.

However, although the number of institutions in the university sector has expanded rapidly, the number of PhD students has remained relatively low.

In 2015, the enrolment of PhD students stood at 4,915 male and 2,231 female, bringing about a total of 7,146 candidates (or 1.3 per cent of the total higher education intake) in all categories of institutions from private to chartered universities.

There are a number of challenges that have accompanied the phenomenal growth of the higher education sector in Kenya, including funding, quality, diversity of programmes, inadequate infrastructure to support growing student numbers, and inadequately qualified staff. Most of the new universities established within the past ten-year period have also initiated doctoral programmes but are facing even more constraints, especially with qualified staff and facilities for doctoral training. This is the higher education context surrounding research training and PhD capacity in Kenya.

## 1.2 Current research and doctoral training landscape

### 1.2.1 Overview

By regional standards, Kenya is rated among the most competitive research systems in Africa (Tijssen, 2007) with about 3,794 research personnel (in all research and development, not just university-based) of whom about 35 per cent have PhD qualifications (NEPAD, 2010). Kenya is also placed fourth after South Africa, Egypt and Nigeria in knowledge generation in Africa (INASP, 2012). Findings from a recent bibliometric study of science, technology engineering and mathematics (STEM) research output in Sub-Saharan Africa indicate that East African researchers tend to be highly mobile and internationally connected beyond the region. Seventy per cent of

research output was co-authored with collaborators from outside the region, and 57.3 per cent of research output was authored by mobile scholars who have spent time inside and outside of Kenya (Elsevier and World Bank, 2014).

Kenya's Vision 2030 recognises the role of research in knowledge creation and utilisation in the country. The government (CUE, 2015) envisages the contemporary Kenyan university to be at the cutting edge of research and knowledge to enable the country to respond to its developmental challenges. However, the Commission for University Education has acknowledged the inadequacy of staff with doctoral qualifications in Kenyan universities. Therefore, there is an urgent need to build PhD capacity in the country, both in terms of fulfilling teaching needs at Kenya's higher education institutions, and in terms of meeting the national research agenda.

### 1.2.2 National policy actors related to higher education

The *Ministry of Education* is a key actor with the mandate to harmonise, implement, guide and co-ordinate matters of higher education, science and technology through its departments which have distinct functions: Directorate of Technical Education, Directorate of Research Management and Development (DRMD), National Council of Science and Technology, Directorate of Technical Accreditation and Quality Assurance, Directorate of Higher Education (DHE) and the Support Services Department. Of interest to this study are the DRMD and the DHE. The DHE focuses entirely on university-level education, including the co-ordination of higher education policy with the

objective of expanding access and improving the quality and relevance of university education, expanding access especially in strategic overseas areas, facilitating development of programmes and collaborations, and administering university scholarships. The DRMD oversees the development and promotion of research activities in the country. Its core functions are to integrate research into national development; formulate national research policy; co-ordinate research, research inventory and dissemination, and mobilise resources for research and development (R&D), research promotion and the sensitisation of R&D stakeholders; and to create regional and international collaboration on R&D.

*The Commission for University Education (CUE)* was established under the Universities Act of 2012 and is the successor to the Commission for Higher Education (CHE). CUE is a government agency mandated to regulate the provision of university education in Kenya. It ensures the maintenance of standards, and the quality and relevance in all aspects of university education, training and research.

### 1.2.3 National policy actors related to research

*The National Commission for Science, Technology and Innovation (NACOSTI)*, established under the Science, Technology and Innovation Act 2013, manages and regulates research in Kenya. NACOSTI is mandated to regulate and assure quality in the science, technology and innovation sector and provide advice to the government on the sector. It has steered scientific advancement and technological development in the country through the administration of the Government Research Endowment Fund since the 2008–09 financial year. The fund is intended to support scientific research and innovations in science, technology and innovation priority areas for national development.

*The National Research Fund (NRF)* was established in 2014 to facilitate research for the advancement of science, technology and innovation as provided in section 33 of the Science, Technology and Innovation Act 2013. It mobilises resources for the Kenya National Innovation Agency from the government, the private sector, venture capital, development partners and

other sources. It manages and invests the funds for research and promotes multidisciplinary collaboration among universities and research institutions in Kenya. It also fosters co-operation and sharing of research information and knowledge, including supporting conferences, workshops, seminars, meetings and other symposia, and performs the monitoring and evaluation of the results and impact of the research activities financed by the Fund.

## 2. Methodology

This report is based on a comprehensive document analysis, data from questionnaires and selected interviews conducted with key stakeholders in a sample of universities and industry in Kenya. The methodology adopted included a literature review, an analysis of PhD graduate data from national and international sources, a review of national policy documents to identify the national-level agenda and enabling systems. To collect primary data, questionnaires were administered to all the identified institutions and organisations. The questionnaire focused on the following key facts: the type and volume of research activity, the priorities and broad thematic/disciplinary focus, the number and qualifications of research staff, details of research funding received and sources of funding, indication of

research outputs, indication of existing or recent collaborative work and knowledge exchange with other organisations. Customised interview schedules were developed for informants from university management, government departments, industry leaders, PhD scholars and alumni, selected through convenience sampling.

Interviews focused on identifying and characterising the institution's current and future PhD training culture and priorities, predominant research themes, methodological approaches, research infrastructure and profile of research staff (the number of staff and their qualifications), internal regulatory structures and policy frameworks; sources, mechanisms, strategies, and challenges of funding PhD studies; factors promoting or hindering PhD studies; and the presence and nature

of research co-operation at local, national and international levels. The interviews were recorded, transcribed and thematically analysed. The research team undertook the coding and developed an analytic framework for identifying, building, collating and managing the key concepts and themes emerging from the interviews.

In line with the aims of the study to capture a cross-section of diverse higher education institution (HEI) types, ten HEIs were selected for the study. The resulting sample comprised seven public and three private universities, all of which are accredited by CUE. To ensure diversity, the sampling criteria included the age of the institutions, location, research productivity, status (public/private), number of doctoral programmes and accessibility. Table 1 presents the profiles of the institutions selected for the study.

**Table 1:** Profiles of the sampled institutions

Institution	Established	Number of PhD Programmes	Structure of PhD provision	Thematic areas
University of Nairobi	1970	166	6 schools which house 1 centre, 16 schools, 6 institutes and cover 3 faculties	Humanities and Social Sciences (68)
				Biological and Physical Sciences (34)
				Health Sciences (32)
				Architecture and Engineering (16)
				Education and External Studies (11)
				Agriculture and Veterinary Sciences (5)

**Table 1** continued

Institution	Established	Number of PhD Programmes	Structure of PhD provision	Thematic areas
Jomo Kenyatta University of Agriculture and Technology	1994	65	4 colleges, 5 schools, 1 faculty and 3 institutes	Entrepreneurship, Procurement and Management (13)
				Institute of Tropical Medicine and Infectious Diseases (ITROMID) (11)
				Biomedical Sciences (10)
				Biological Sciences; Engineering (7 each)
				Agriculture (6)
				Physical Sciences (5)
				Mathematical Sciences (3)
				Computer Science and Information Technology (2)
Biotechnology Research (1)				
Egerton University	1987	59	8 faculties and 1 institute	Arts and Social Sciences; Education and Community Studies (12 each)
				Agriculture (11)
				Science (9)
				Environment and Resources Development (7)
				Engineering and Technology (4)
				Commerce (2)
				Health Sciences; Women, Development Studies (1 each)
Maseno University	2001	53	9 schools and 1 faculty	Arts and Social Sciences (18)
				Biological Sciences and Physical Sciences (9)
				Education (8)
				Agriculture and Food Security (6)
				Public Health; Development and Strategic Studies; Mathematics and Actuarial Science (3 each)
				Environment and Earth Sciences (2)
				Business and Economics (1)

**Table 1** continued

Institution	Established	Number of PhD Programmes	Structure of PhD provision	Thematic areas
Kenyatta University	1985	37	6 schools	Humanities and Social Sciences (26)
				Visual and Performing Arts (5)
				Pure and Applied Sciences; Education (2 each)
				Business; Economics (1 each)
Moi University	1984	31	8 schools	Arts and Social Sciences (9)
				Education (6)
				Biological and Physical Sciences; Human Resource Development; Information Sciences (4 each)
				Business and Economics (2)
				Engineering; Tourism, Hospitality and Events Management (1 each)
Pwani University	2007	18	4 schools	Education; Humanities and Social Sciences (6 each)
				Pure and Applied Sciences; Agriculture and Environmental Sciences (3 each)
Catholic University of Eastern Africa	1984	12	3 faculties	Theology; Education (5 each)
				Arts and Social Sciences (2)
Mount Kenya University	2008	7	3 schools	Social Sciences (4)
				Education (2)
				Business and Economics (1)
University of Eastern Africa, Baraton	1989	2	1 school	Education (2) (Teaching and Curriculum and Education Administration)

Source: CUE (2015) and institution websites

In order to provide cross-sector context to the institutional data, additional information was obtained through interviews with staff at the Ministry of Education, CUE, NACOSTI,

representatives of industry and international agencies engaged in higher education in Kenya.

### 3. Availability, thematic priorities and quality of research and doctoral training

#### 3.1 Availability and thematic priorities of PhD provision

All the public universities in Kenya offer PhD programmes with a number of private universities such as Mount Kenya University and the University of Eastern Africa, Baraton also beginning to offer these programmes. This growth and expansion in PhD programmes coincides with the growth in numbers of students enrolling for PhD training. However, it is important to highlight that the growth and expansion in PhD programmes does not match the growth of institutions of higher learning. As noted above, for the academic year 2015–16 there

were 7,146 PhD students in Kenyan universities representing 1.3 per cent of the total student population (Mukhwana et al, 2016).

Doctoral research is heavily skewed towards business and administration, with moderate numbers in other social sciences, arts and humanities and agricultural sciences, but with fewer students in health sciences, other natural sciences and engineering. This suggests that despite the strategic emphasis on STEM in national policies, there are still low enrolments in these subjects. The distribution of PhD enrolments by discipline and gender is presented in Table 2 for the public and

private sectors respectively. Indeed, the diversity of doctoral programmes in Kenya is of concern for the government. While it is acknowledged that doctoral research in business, administration, and arts and humanities reflects the needs of the labour market and society, at the same time it is believed that over-concentration in these fields will disadvantage key national development sectors and may lead to over-production of graduates with similar skills (*ibid.*: 28). A cause for further concern is the disproportionate number of male students enrolled in PhD programmes compared to their female counterparts. The current ratio of male to female students is 2:1 (*ibid.*: 30).

**Table 2:** PhD enrolments in Kenyan public and private universities

Cluster	Male (Public)	Female (Public)	Public total	Male (Private)	Female (Private)	Private total	Combined total	Cluster coverage as % of total PhD enrolments
Business and administration	1,678	623	<b>2,301</b>	84	58	<b>142</b>	<b>2,443</b>	<b>35.12%</b>
Humanities and arts	301	136	<b>437</b>	257	63	<b>320</b>	<b>757</b>	<b>10.88%</b>
Education (arts)	347	232	<b>579</b>	21	26	<b>47</b>	<b>626</b>	<b>9.00%</b>
Social and behavioural science	366	95	<b>461</b>	42	66	<b>108</b>	<b>569</b>	<b>8.18%</b>
Health and welfare	174	149	<b>323</b>	4	5	<b>9</b>	<b>332</b>	<b>4.77%</b>
Life science and physical sciences	252	79	<b>331</b>	0	0	<b>0</b>	<b>331</b>	<b>4.76%</b>
Environment	183	89	<b>272</b>	0	0	<b>0</b>	<b>272</b>	<b>3.91%</b>
Other	3	0	<b>3</b>	127	116	<b>243</b>	<b>246</b>	<b>3.54%</b>
Agriculture, forestry and fisheries	181	52	<b>233</b>	5	3	<b>8</b>	<b>241</b>	<b>3.46%</b>
Teacher training	98	63	<b>161</b>	55	23	<b>78</b>	<b>239</b>	<b>3.44%</b>
Journalism and information	127	80	<b>207</b>	15	12	<b>27</b>	<b>234</b>	<b>3.36%</b>

**Table 2** continued

Cluster	Male (Public)	Female (Public)	Public total	Male (Private)	Female (Private)	Private total	Combined total	Cluster coverage as % of total PhD enrolments
Mathematics and statistics	145	75	<b>220</b>	7	4	<b>11</b>	<b>231</b>	<b>3.32%</b>
Computing	143	54	<b>197</b>	1	3	<b>4</b>	<b>201</b>	<b>2.89%</b>
Engineering	61	10	<b>71</b>	0	0	<b>0</b>	<b>71</b>	<b>1.02%</b>
Services	29	31	<b>60</b>	0	0	<b>0</b>	<b>60</b>	<b>0.86%</b>
Veterinary	29	12	<b>41</b>	0	0	<b>0</b>	<b>41</b>	<b>0.59%</b>
Security and conflict resolution	26	5	<b>31</b>	0	0	<b>0</b>	<b>31</b>	<b>0.45%</b>
Education (science)	16	8	<b>24</b>	0	0	<b>0</b>	<b>24</b>	<b>0.34%</b>
Architecture	7	1	<b>8</b>	0	0	<b>0</b>	<b>8</b>	<b>0.11%</b>
Law	0	0	<b>0</b>	0	0	<b>0</b>	<b>0</b>	<b>0.00%</b>
Manufacturing	0	0	<b>0</b>	0	0	<b>0</b>	<b>0</b>	<b>0.00%</b>
<b>Total</b>	<b>4,166</b>	<b>1,794</b>	<b>5,960</b>	<b>618</b>	<b>379</b>	<b>997</b>	<b>6,957</b>	<b>100%</b>

Source: Adapted from CUE (2016: 36, 40)

### 3.2 Factors driving the introduction and expansion of PhD provision

PhD programmes in Kenya are initiated by the departments through the respective schools and finally with the approval of senate and university management. Data collected for this report shows that the establishment of most PhD programmes is based on current gaps in the doctoral programmes within the departments and faculties, the availability of qualified teaching staff and supervisors, the demand for such programmes from prospective students and faculty and, at times, as a response to the needs of governments and other stakeholders. In some cases doctoral programmes have been established as an

outcome of international partnerships and collaborations that Kenyan universities are engaged in. Other factors informing the introduction of PhD programmes include: the needs of stakeholders (industry/business); labour market demand for the programme; programme alignment to the university's mission and strategic plan; programme alignment to national priority development agendas; availability of qualified and experienced faculty; and availability of adequate learning resources and research infrastructure. However, the factors least considered are the influence of the professional associations, availability of funding and sustainability of the programme(s) over the medium to long term.

A recent CUE regulation that mandates a PhD qualification for university teaching staff by 2018 is providing impetus for expansion of PhD provision. This requirement has caused the demand for PhD training opportunities to soar in Kenyan universities as staff need to meet these new requirements. Departments are also under great pressure to ensure that most of their staff have PhDs as this allows them to enhance their internal capacities as departments and also to establish new PhD programmes. This new development should not, however, lead to compromising of quality, and the demand for PhD degrees is by far outweighing the capacity of the system to meet the demand.

In addition to this regulatory requirement, the growth is also driven by the need to develop a research culture among faculty members, in the departments and for the growing industry's interest. In one of the institutions it was noted that one other reason for introducing PhD programmes was for the purpose of revenue generation as faculties and schools were required to diversify their academic provision to attract more fee-paying students.

Furthermore, there is a need to embrace multidisciplinary research programmes. It was noted that some of the universities had already started inculcating multidisciplinary into their programmes. This includes setting up courses that could be taken by students from different disciplines and even sharing human resources from different faculties. This trend was evident in almost all the public universities included in this study. There was also a growing number of tailor-made joint seminars organised for doctoral students, most of which were much appreciated by students who have graduated from the universities.

### 3.3 PhD completion trends

#### 3.3.1 National PhD completion trends

Kenya has set its national benchmark for doctoral graduation completion rate at 20 per cent, which means that for every cohort the target was to ensure that 20 per cent of the students graduate within the stipulated time of three years. However, the national average from the higher education institutions is currently at 11 per cent, and the average time to completion is

six years (i.e. double the prescribed duration of three years). Indeed, low completion rates and increasing dropout rates are considered a threat to doctoral training in Kenya.

A study by Ng'ethe et al. (2012) set out to determine the influence of leadership style; establish the influence of remuneration; determine the influence of training; establish the influence of promotion; and to establish the moderating influence of personal characteristics on academic staff retention in public universities. The study used a survey design and took a sample of 492 (ten per cent) of the whole population of lecturers in the public universities. It attributed the problems of completion to several factors including funding constraints for students, institutional challenges especially those related to supervision and inadequate support programmes and facilities for graduate students (*ibid.*: 9). The interviews with the alumni revealed several challenges that face graduate students in the Kenyan higher education system. In addition to funding, there were also challenges associated with student life circumstances, especially the fact that most of them were in employment and already had families thus constraining their time and resources that could be deployed to their PhD training. A number of the PhD students who were staff within the universities complained of being weighed down by a heavy workload especially due to the high student numbers. At the same time, the students felt that the programmes were not flexible enough to provide for their needs, especially as most of them were not conventional students.

#### 3.3.2 Completion trends at the sampled institutions

The study noted that several institutions faced the challenge of low completion rates of PhD programmes. While we were not able to collect accurate data on completion rates for the past ten years, Table 3 overleaf outlines numbers of students graduating at the sample institutions based on data submitted to CUE for 2011–14. Establishing accurate completion/throughput rates is a challenge for institutions not just at postgraduate level but undergraduate too. They cannot with definite data explain at which point each learner is, due to deferment, interschool transfers and expected time of graduation. This is an issue that needs to be attended to by any future programme design and evaluations. The sampled institutions were able to comment on PhD dropout rates, however, and over the last ten years this was found to be about five per cent in some institutions while in others it was as high as 20 to 50 per cent.

Despite the concerning picture painted above, it is important to note that the time to graduation has been decreasing in the past few years, especially due to International Organization for Standardization (ISO) requirements resulting in new institutional policies to manage doctoral training. Institutional policies have also been developed in response to the CUE requirements that every university should account for the progress of every graduate student and reports are periodically submitted by the academic departments and/or schools. (These issues are discussed in further detail in Section 3.5 on quality assurance practices.)

**Table 3:** PhD graduation trends in the sampled universities

University	Academic year				Totals
	2011–12	2012–13	2013–14	2014–15	
University of Nairobi	n/a	n/a	74	43	117
Moi University	58	40	42	56	196
Kenyatta University	55	62	115	117	349
Egerton University	12	21	29	22	84
Jomo Kenyatta University of Science and Technology	46	46	65	103	260
Maseno University	18	24	21	18	81
Pwani University	0	0	0	3	3
Catholic University of Eastern Africa	16	22	23	19	80
Mount Kenya University	0	4	4	9	17
University of Eastern Africa, Baraton	n/a	n/a	n/a	n/a	n/a

n/a – no data was available at the time

Source: Adapted from CUE (2016: 134–135)

Doctoral students took a long time to graduate for several reasons. As discussed earlier in relation to national trends, one of the main reasons cited for delay in completion included students' personal life and work circumstances and funding constraints. This was supported by the interview results which revealed that many PhD students were unable to complete their studies within the stipulated time of three years because they were engaged in other activities such as part-time teaching, other employment and family commitments. Most PhD students were relatively older with the majority being over 40 years old, which would explain this. In addition, they stated that supervisors took too long to give them feedback on their work

and there were also no institutional mechanisms to seek redress in such cases. Supervisors were of the view that some of the students did not keep in touch after completing coursework. However, some institutions cited other factors such as the lack of research facilities and equipment; supervisors who take on the job without commitment; shortage of qualified supervisors; work overload for the graduate faculty members; and the fact that employers of PhD students do not provide funded leave, therefore students lack the time to concentrate on their studies. There was one exception to this. A deputy vice-chancellor responsible for research at one institution observed that 'in order to encourage many staff to undertake

their PhD studies, there is support offered in various ways: their workload is reduced to take up 40 per cent of their time while the other 60 per cent is dedicated to their own research.'

It was also noted that the timeframes for completing different stages of doctoral training were quite long, causing delays for the students. For instance, the process of developing and approving the research proposals was slow so that by the time students are allowed to go to the field to collect data it was usually towards the second half of their second year. Therefore, they had barely enough time to collect data and write the thesis in readiness for examination.

### 3.3.3 Implications of low completion rates for the format of provision

In Kenya doctoral training is offered in two main tracks: regular full-time and part-time provision.<sup>3</sup> Both tracks can either be taken through advanced research with the thesis as the end product or both course work and project report/thesis at the end depending on the organisation of the institution. In the second option the course work does not diminish or replace the requirements for thesis writing.

The interview responses suggest that PhD provision needs to cater to the growing diversity of students requiring doctoral education, especially those already in employment. In line with this, Kenyan universities will have to diversify and broaden the pathways to the PhD degree. This is critical to encourage candidates in specialised fields who may not have the liberty to leave their jobs to undertake on-campus PhD training. At the same time, in order to address the challenge of completion for the typically mature cohort, it would be useful to develop and nurture more young scholars in PhD programmes, as this could lead to higher throughputs and in the end more sustainability of the research and knowledge production systems in the universities.

## 3.4 Quality assurance practices in PhD training

### 3.4.1 Overview: policies and concepts

We have already noted the commitment of the government of Kenya to quality reforms through the new provisions granted to the CUE. At the institutional level, most Kenyan universities have

established quality assurance offices. This has been mainly as a result of the German Academic Exchange Service (DAAD) and the Inter-University Council for East Africa (IUCEA) project on quality reforms for East African universities. Through the project, member universities of IUCEA were trained on how to manage, implement and sustain institutional quality assurance mechanisms. In Kenya, the implementation of ISO standards in the universities has also improved quality of service in different sectors, especially systems and procedures which have also had impacts on doctoral training. The public universities studied had policy documents and operation manuals on quality. This was an indication of their commitment to enhance the quality of their programmes even amid the many challenges they were facing. In addition, they had policy documents and regulations governing PhD training. As one of the deans noted: 'our university is keen on quality training and completion rates of PhD and this is ensured through the use of approved policies and procedures and qualified graduate faculty.' The universities were attempting to adapt several ways of responding to quality issues beginning with admission regulations and procedures for PhD students, institutional accreditation, programme accreditation, systems and procedures for evaluating the quality of teaching and learning related to PhD programmes. In addition, they observed that they effectively handled systems and procedures for assessing the quantity and quality of research-related PhD programmes, policies and procedures for supervision of PhD students, regulations and procedures for thesis examination and structures to co-ordinate and manage PhD programmes.

In addition to specific policies regulating the administration of PhD programmes, improving the quality of PhD provision is also understood more generally by institutions as enhancing the relevance of programmes. The older and well-established universities indicated notable changes in the following areas: (a) change from training of PhD through research only to training through course work and research (in this study these institutions include Egerton University, Moi University, and the Catholic University of Eastern Africa); (b) providing a more practice-orientated PhD training; (c) curriculum changes and revisions focused on content and number of courses offered in a programme; and (d) the introduction of new and specialised programmes. These changes have been initiated for several reasons, including the need to respond to the demands of the labour market; the growth and access to information communication technologies (ICTs); responding to the unpopularity of some of the programmes among PhD students; and helping PhD students familiarise themselves with the faculty prior to preparing and writing proposals.

### 3.4.2 PhD admission regulations

In most of the institutions there were clear rules and procedures governing admission to doctoral programmes. These were mainly established by respective senates or graduate schools and administered either by the faculties or school or by the graduate schools. In most universities admissions to PhD programmes were centralised in the graduate schools. Only very few had admissions processed at faculty level.

3. Data collected for this study did not indicate the proportion of PhD students in each of these study modes or tracks.

### 3.4.3 Academic staff qualifications

In the provision of quality PhD training, qualified academic staff is a fundamental requirement. It was noted that well over half of academic staff in public universities did not have PhDs. This situation was more serious in the newly established public universities and in the private universities. Overall, the associate and full professors represent 5–10 per cent of the total number of staff, and about 40 per cent of the academic staff hold doctoral degrees in the established older

universities. However, what is interesting to note is the fact that schools or faculties that are arts- and social science-based have higher numbers of PhD holders (approximately 40 per cent). In the science and technology-based schools or faculties, PhD holders are as low as 25 per cent. In addition, in some of the young universities and new schools or faculties, there were hardly any professors. The majority of academic staff have master's degrees as their highest academic qualification. The low level of academic staff

qualifications are compounded by the fact that the numbers of academic staff qualified to teach PhD students are also low. The findings of the current study mirror the status of qualifications of staff as highlighted by Mukhwana et al. (2016). The academic staff qualification per university category is shown in Table 4. This data shows that there is a lack of adequately qualified and experienced academic staff to effectively drive the process of PhD training and research in Kenya, hence the need to train more people at doctoral level.

**Table 4:** Academic staff qualifications by type of university

University category	Academic staff qualifications				Total	Proportion of staff at each university category with PhD qualifications (%)
	PhD	Master's	Bachelor's	Diploma		
Public chartered universities	4,215	5,661	1,004	530	11,410	37%
Public university constituent colleges	133	292	100	78	603	22%
Private chartered universities	923	1,936	168	43	3,070	30%
Private university constituent colleges	113	91	6	2	212	53%
Private universities with letter of interim authority	220	713	87	3	1,023	21.5%
<b>Total</b>	<b>5,604</b>	<b>8,693</b>	<b>1,365</b>	<b>656</b>	<b>16,318</b>	
Proportion of total staff by qualification level (%)	34%	53%	9%	4%	100%	

Source: CUE (2016: 53)

### 3.4.4 Process of PhD supervision

Supervision has been identified as one of the major challenges afflicting PhD training in Kenyan universities. As already discussed in the previous section, this is partly due to the inadequate numbers of staff with doctoral qualifications who can supervise doctoral students. As a result of this challenge, it was also noted that supervisors in several instances were allocated more doctoral students than they could manage, which led to delays and could also have quality implications. In one of the public universities, one supervisor confirmed graduating five students the previous year, suggesting a heavy supervision load and the possibility that the students may not have obtained the requisite supervisory assistance in view of their numbers.

Institutions actually did have specific regulations and policies governing the process of PhD supervision, namely for assigning PhD supervisors, establishing supervisory teams, the number of PhD candidates assigned per supervisor; requirements for the number of meetings between PhD candidate and supervisor(s); and progress reports schedules and milestones. Furthermore, the study results established that each PhD student is assigned at least two supervisors in some cases, while each supervisor is allowed between three to four PhD candidates for supervision. This is information that was also highlighted in the Kenyatta University Graduate School handbook (2012), as well as that of Moi University Directorate of Graduate Studies. In the various universities in Kenya, the requirements for the number of meetings between PhD candidate and supervisor(s)

ranged from every two weeks to every three months (quarterly). Equally, the period for submitting progress report schedules and milestones in the supervision process ranged from every month to every four months.

However, it is important to note that the only aspect that almost all the institutions did not seem to consider in the supervision process is the requirement for training of supervisors and a code of ethics to guide supervision of students. Despite evidence that most institutions have effective supervision processes, major challenges to the effectiveness of quality assurance processes still exist. A further concern was the difficulty experienced in the actualisation of the requirements of these policies.

### 3.4.5 Provision of resources and facilities for PhD training

The research facilities, equipment, laboratories and other resources needed by various institutions are basically determined by the nature of PhD programmes being offered, the number of students enrolled and other unique institutional factors. The types, quality and amount of resources dedicated to PhD training varied from one institution to another. The results further show that the thematic areas are not dependent on the provision of these resources and equipment. The institutions under study in this research project further provided an evaluation of the adequacy and quality of facilities, equipment, laboratories and other resources used by PhD students. The results indicated that most institutions had structures and facilities in place to support PhD training. Most of the respondents observed that among the factors

supportive of PhD training were the library facilities and holdings: electronic journals; the electronic learning resources like computers and internet access; and the research infrastructure like laboratories, equipment and IT. In addition, the web-based campus computer services, working space (office) for PhD students and career development support were adequate and of good quality. However, a smaller number of the institutions indicated that this research infrastructure was inadequate and of poor quality.

### 3.4.6 Summary

Despite the fact that some institutions provide regulations on quality assurance of PhD provision, the findings from the interviews and questionnaires show that there are great variations in the systems and procedures that universities have adopted. This indicates that the issue of quality receives only superficial attention. The institutions do not deliberately focus on pertinent areas that would greatly enhance quality in the provision of PhD programmes. Areas that require additional attention include institutional systems for evaluating the organisation and quality of PhD supervision, systems and procedures for monitoring the progress of PhD students, as well as structures to facilitate partnership with industry and business sectors related to PhD training. Further, they have not effectively dealt with systems to promote a stimulating research and working environment for PhD students, institutional systems and mechanics for funding PhD research and institutional systems for the periodic review of PhD programmes.

# 4. National research agenda and doctoral training

## 4.1 Defining the national research agenda

Kenya's Vision 2030 is a blueprint that is shaping the country's future development trajectory. Within the social pillar of the vision, education and research are recognised as having a clear and strong role in the realisation of the vision. Kenya's Universities Act locates higher education within the context of Kenya's Vision 2030, which aims to transform Kenya into a globally competitive, middle-income country by 2030. The strategy acknowledges the university sector as core to the development of the necessary human resource base necessary to achieve these goals primarily through the provision of high-quality, skill-based and results-orientated learning.

In the last decade, a number of policies have emerged all grounded in Kenya's Vision 2030 document. Sessional Paper No. 1 of 2005 has been the important turning point in the policy landscape. It called for the development of a competitive and demand-driven higher education sector with knowledge production playing a crucial role. From this Sessional Paper, the Kenya Education Sector Support Program (KESSP) was developed leading to a sector-wide funding programme for education including research at the universities. The Paper introduced the new dimension of a market-oriented co-ordination and financial diversification in higher education, more privatisation and public-private partnerships in several sectors including research (Jowi and Obamba, 2013). From 2006, there was a shift in focus to the need for a knowledge-based policy and development trajectory which clearly connected knowledge, higher education and sustainable development. This

called for an emphasis on science, technology and innovation, knowledge-driven development and university-industry links, although little support was given to this. The Public Universities Inspection Board (2016) called for a new knowledge-based economic dispensation in Kenya that was to largely rely on research and knowledge production, thus putting the universities at the core of the development process. The National Science, Technology and Innovation Policy and Strategy (Kenya Government, 2009) also underscores the role of research and doctoral training in the future development of the country.

Regarding research, various reconstituted institutions have been created under Kenya's new constitution of 2010. Of prime importance is NACOSTI. In 2012, the government approved the allocation of two per cent of gross domestic product (GDP) to be spent on research and innovation, although this funding and percentage has yet to be fully realised. By 2014 it stood at 0.8 per cent of GDP, which is far lower than government projections.

## 4.2 Alignment between institutional research priorities and the national agenda

### 4.2.1 General alignment

As discussed in Section 3.1 on the thematic priorities of PhD programmes, the national context and policy frameworks have in a way guided the research orientations in the ten institutions, suggesting that there is a common direction in the prioritisation of institutional plans and policies in alignment with national priorities. Furthermore, an analysis of the establishment of these institutions reveals that efforts have

been made to ensure that a variety of PhD programmes have been offered over the years. In spite of the similarities in the graduate training process, the nature and type of graduate programmes vary considerably, rendering each of these institutions unique with wide-ranging programmes in science, the arts or social science thematic areas. However, these would appear to depend on the philosophical and academic thematic orientation of each institution. In some cases these are determined by the geographical settings of the university and others determined by the initial parent institutions that led to their establishment. It should be noted that in the Kenyan context when a university campus becomes a university college, practice dictates that it must begin by offering the programmes offered by the parent university before being able to develop its customised programmes upon becoming a fully fledged university.

The research agenda of each institution indicates that they are geared towards the attainment of the Kenya national research and development agenda as portrayed in Vision 2030, and adherence to the CUE regulations and the Universities Act 2012 on the provision of given graduate programmes. Most of the universities make reference to the Millennium Development Goals (MDGs) rather than the Sustainable Development Goals (SDGs) in their strategic plans – the SDGs were accepted by the UN in 2015, so this observation indicates that these university plans are not necessarily current. It may be necessary for the institutions of higher learning within Kenya to review their strategic plans to accommodate the international move from MDGs to the SDGs, thus providing

for a very clear and broader pathway for education within the international development goals and framework. All the research policies reviewed did not directly refer to PhD studies but to wider university research activities and externally funded projects. Instead, terminology like research, postgraduate studies/students and graduate students/studies were used, which in this review were considered as umbrella references to all forms of research to be conducted in the institution, including that by master's and PhD studies/students.

In a number of universities such as Moi University and the Catholic University of Eastern Africa, research activities are organised under the directorate of research. The activities are determined by the demands of the research policy and research strategy of the institution. The main activities funded are conferences, inaugural lectures, public lectures, thematic seminars and workshops, research grants for staff to carry out research and school journals among other activities. In general, it was found that the research strategies and priorities in higher education are

in tandem with the goals of NACOSTI, the agency mandated to fund and manage research.

#### 4.2.2 NACOSTI-funded projects

One of the key focus areas of funding by the Commission is capacity building through the use of PhD research. A total of 123 innovation projects have been funded, some resulting in business start-ups for the innovators. Table 5 provides a bird's eye view of the science, technology and innovation grant categories for PhD training and development.

**Table 5:** NACOSTI-funded projects in science, technology and innovation by category

Summary of science, technology and innovation grant-funding categories – funded projects (2009–14)						
Category	First call	Second call	Third call	Fourth call	Fifth call	Total
Research projects	92	31	28	17	20	188
Women scientists	14	32	26	18	11	101
Innovations	14	8	19	37	45	123
PhD students	22	41	78	100	92	333
MSc/MA students	22	24	48	100	100	294
Post-doctoral	19	17	-	-	-	36
Research facilities	4	4	-	-	-	8
Sponsorship of conferences	30	31	15	-	24	100
Kenya/South Africa programme	6	10	11	-	12	39
NACOSTI-JSPS programme	2	2	1	-	2	7
Kenya/German joint PhD programme (DAAD)	-	-	-	-	-	54
<b>Total</b>						<b>1,283</b>

Source: NACOSTI 2012

Another NACOSTI scheme is the Research Chairs Initiative, which was announced on 5 June 2016. This is intended to attract Kenyan scientists in the diaspora back to an improved research environment, and retain top researchers already at universities. The programme was launched with two research chairs on health systems and agricultural biotechnology funded by NACOSTI and Canada's International Development Research Centre (IDRC). The latter is funding one of the chairs with a CDN\$1 million (US\$962,000) grant over five years in the project's pilot phase. The research chairs are drawn from public and private universities in Kenya. The next phase will include chairs in mining and space science. NACOSTI's other objective is to curtail Kenya's continued loss of established researchers to developed countries which offer them better remuneration, facilities and research funding. The funds provide for equipment and better salaries for scientists, but the host universities are expected to commit to improving the institutional environment for research.

#### 4.2.3 Translating the research agenda into the Medium Term Plans

The research agenda of Kenya is nested in Kenya's Vision 2030 and the government's plan for its implementation in successive five-year Medium Term Plans (MTP). The first such plan ran until the end of 2012. The second MTP (2013–17) gives priority to devolution and to more rapid socioeconomic development with equity as a tool for building national unity. It is noted that the second MTP also aims to build on the successes of the first MTP (2008–12), particularly in increasing the scale and pace of economic transformation through infrastructure development, and strategic emphasis on priority sectors under the economic and social pillars of Vision 2030. The social pillar is crucial to the issue of PhD capacity because it encompasses university education and regards it as the driver of change in society. Under this MTP, transformation of the economy is pegged to rapid economic growth in

a stable macroeconomic environment, modernisation of infrastructure, diversification and commercialisation of agriculture, food security, a higher contribution of manufacturing to the GDP, wider access to African and global markets, and wider access for Kenyans to better quality education and healthcare. This agenda has been discussed earlier through the roles of national institutions charged with research, quality assurance and university education. In Kenya the research area of agricultural biotechnology is a priority because the country is weak in agricultural innovation yet demand for food production is rising. This is an example of what is referred to as university–industry links designed to ensure that knowledge generated at the universities helps solve industry problems.

# 5. Engagement with industry, the private sector and social challenges

The Kenyan higher education sector has quite limited links with industry and the private sector. University research and training has over the years not attended to the demands of the industrial sector and industry and the private sector have also not found an interface with the university. This gap needs to be addressed to enable stronger relations between these two sectors. It was noted that in the 1990s Moi University created an office to co-ordinate its links with industry, but this was later closed.

At the regional level, the IUCEA has been creating forums for debates and practicalities on how universities and industry could benefit from their synergies. The Kenya National Strategy for University Education Taskforce draft report outlines the strategic goals, objectives and strategies for the linkages and partnerships (Ogada, 2000). The strategies support seven types of linkages and partnerships, namely, university–industry; university–university; university–research institutes; university–middle-level colleges; university–international organisations; university–community; and university–relevant professional regulatory bodies. The main aim is to develop strong university linkages and partnerships that enhance mutual learning, research and innovation. The following justification for this is provided:

a. Strong linkages and partnerships will enhance the dissemination and utilisation of research findings and innovations emanating from the universities.

- b. Strong linkages and partnerships will enable universities to access resources available in the private sector.
- c. Linkages and partnerships provide platforms for consensus regarding policies on strategic areas of the economy.
- d. Linkages and partnerships can encourage pooling of human, physical and financial resources.
- e. Strong linkages and partnerships are necessary for the diversification of financing and the incorporation of talent in the governance structures.
- f. Linkages and partnerships provide an opportunity for identifying community needs and enhance the capacity for community involvement and improvement.

It is perceived that university partnerships, linkages and collaborations will enable universities to undertake relevant research to support industry and the job market. Consequently, the quality of education offered in the universities can improve, in particular PhD training. From the findings of this study it is difficult to determine the impact of these partnerships, linkages and collaborations in practice. There have been success stories in specific cases, such as the collaboration between Moi University and Indiana University in the US (AMPATH) in the area of HIV/AIDS management. Another model is the linkage between Jomo Kenyatta University of Agriculture and Technology (JKUAT) and Syngenta

on crop protection in which the linkage involves product testing and development and has components of staff exchange, students' placement and joint research. This is a successful example of integrating PhD students into a well-funded research project. However, not all institutions have had such profound effect on addressing societal challenges.

Institutions also need to pay attention to employee expectations of doctoral research training. Interviews with representatives from industry suggested that there is a demand for graduates with a multidisciplinary background. They confirmed that they are keen on complementary skills that could enable graduates to be more multifaceted. This finding supports the recent move by some institutions noted in Section 3.2 to establish multidisciplinary PhD programmes. However, as a cautionary note, PhD students themselves may be motivated by considerations that differ from industry expectations. For example, most of the doctoral graduates interviewed mainly wanted to pursue academic careers within the universities. This suggests that it will be difficult for universities to align the thematic priorities of their PhD programmes more closely to industry needs.

# 6. Funding research and PhD training

## 6.1 National and international sources of funding

The government of Kenya has prioritised research funding to achieve industrialisation as outlined in Kenya's Vision 2030. Kenya is signatory to the African Union's protocol that obliges member states to commit one per cent of their GDP to support scientific research (MoE, 2016). The government has taken the initiative to scale up funding for science, technology and innovation. The *National Research Fund* established under the Science, Technology and Innovation Act 2013 aims to facilitate research for the advancement of science, technology and innovation. Kenya's current allocation for research amounts to 0.8 per cent of the country's GDP, an amount that is negligible compared to the country's research needs and potential. In acknowledging that the current investments in research and development remain low, the government has committed to increase research funding to two per cent of GDP through partnership with key stakeholders including the private sector and foundations. The Kenyan government has been allocating \$4 million annually to finance research and innovations since 2008. The challenge is to establish how much of this is invested in education, specifically PhD training, and what the government perceives of PhD training as an aspect of development and building capacity in research.

The *Higher Education Loans Board* (HELB) is a state corporation under the Ministry of Education. It is a revolving fund from which funds can be drawn to lend to needy Kenyan students

pursuing higher education. It disburses loans, bursaries and scholarships to students pursuing higher education in Kenya. HELB provides loans for salaried students undertaking PhD, master's and undergraduate studies, postgraduate bursaries for the extremely needy students, and scholarship awards offered at two levels – the postgraduate scholarship awarded to students pursuing their master's or doctoral studies – and based on academic merit.

The *German Academic Exchange Service* (DAAD) is the only international agency which runs a scholarship scheme supporting master's and PhD studies (fees and stipends) at selected top-quality institutions in the home country or the wider Sub-Saharan Africa, known as the In-Country and In-Region Scholarship schemes. The scholarship schemes are available to students of most Sub-Saharan African countries. In East Africa alone, between 2015 and 2017, 300 scholarships were awarded per year, approximately half of them for PhD students.

## 6.2 Institutional and student experiences related to funding

PhD students in Kenya are required to fund their studies privately or seek funding and scholarships. The majority of students employed by universities have grants or scholarships that are set aside for faculty who are pursuing their PhD programmes with a view to providing opportunities for staff development and capacity building within the institution. Importantly, what emerged from the questionnaire data was that in most of the institutions only a small percentage of the

students' tuition and research fees was met by the universities in which they are teaching. For example, staff undertaking PhD studies at Moi University receive an average of \$1,500, which is only about a third of what they need for tuition fees alone, while the staff of Pwani University are given a full scholarship. The former group argue that this contributes a great deal to the slow pace of PhD study because often these lecturers still have a full teaching load.

Alternative sources of funding cited (in order of prevalence) comprised (a) government agencies like HELB, NRF and NACOSTI; (b) their employers through the staff development fund; and (c) local donors and international donors (in the form of exchange programmes, research project funding, stipends and scholarships from various NGOs). Besides these sources, the two other sources of funds that ranked lowest in all the institutions were the regional government, industry and the business sector. Apart from these sources of funds, some departments and faculties said that they provide financial support for their PhD students in the following ways: departmental internal research fund, waiver of fee for tutorial fellows on PhD programmes; subsidised fees for other academic faculty members; research and support grants for students; and savings from the Privately Sponsored Students Programme (PSSP) fund. However, it is necessary to note, whichever the source, they all acknowledged that the funding was not sufficient.

# 7. The role of international collaboration in building PhD capacity

## 7.1 Overview

The quality of programmes, funding challenges, deficits in supervision and research productivity could be enhanced through international collaborations. There is evidence in a number of the participating institutions such as Moi University, JKUAT and University of Nairobi that international collaborations can contribute very significantly in developing human resource capacities especially through specialised training and a state-of-the-art supervision of PhD and master's students.

## 7.2 Bilateral models

Evidence from the document reviews showed that international organisations such as UIS (2007), FAO, DAAD, the British Council, RUFORUM, CARTER, Afrique One Alliance, OSSREA (2001), and WHO have partnered with a number of universities in providing funding and training for PhD students in advanced research methodology. Furthermore, it is noted that one of the most common areas of collaboration is university–university linkages for both the public and private universities with international universities engaging PhD faculty and student exchange programmes, providing support for joint research projects and offering faculty members opportunities to upgrade their skills through faculty internship programmes. Many universities have benefited tremendously from such international projects. Below we provide examples from Moi University, University of Nairobi, the United States International University and the impact of the collaborations.

In Moi University, the MHO project funded by the Netherlands Ministry of Foreign Affairs among other aspects contributed to the training of 40 doctoral graduates, most of whom returned to work at the university. The VLIR-OUS project funded by Flemish Universities in Belgium supports capacity building at Moi University in engineering, agriculture and biotechnology and in textile research and extension. The Academic Model for Providing Access to Healthcare (AMPATH) brings together leading North American medical faculties led by the Indiana University School of Medicine to work with Moi University on health-related research and training. These are among the several other partnerships that the university has developed. Apart from setting up and facilitating an office to co-ordinate these international activities, the university has also developed a strategy for its internationalisation activities.

The Centre for International Programmes and Links at the University of Nairobi manages their portfolio of international collaborations which have contributed enormously to developments at the university. The deputy vice-chancellor responsible for research and extension at the University of Nairobi emphasised the need for mutual collaboration mainly focused on research and which could also enhance the academic status of the university.

The United States International University co-ordinates the Carnegie Africa Diaspora Fellowship Program, which supports staff exchanges for African scholars in North America and

enables scholars in the diaspora to spend some time in African universities.

The IUCEA has also established new programmes that facilitate collaborations among universities within the region. This is in addition to the initiatives of several other continental organisations such as the Council for the Development of Social Science Research in Africa and the Organization for Social Science Research in Eastern and Southern Africa. Kenya also hosts a number of international research centres that could make a contribution to supporting research and doctoral training. Among these are the International Livestock Research Institute, the Africa Population Health Research Centre, the International Centre of Insect Physiology and Ecology, the International Crops Research Institute for the Semi-Arid Tropics, and the African Economic Research Consortium.

## 7.3 Multilateral models

Kenya also hosts a number of international agencies which have contributed in different ways to supporting research and doctoral training. The German Academic Service (DAAD) for instance has supported the establishment of the *East and South African-German Centre of Excellence for Educational Research Methodologies and Management* bringing together Moi University, Nelson Mandela Metropolitan University in South Africa, Uganda Management Institute and the University of Dar es Salaam to strengthen research, teaching and staff development with specific expertise in educational and

management sciences. A similar centre with a focus on mining engineering has just been inaugurated at Taita Taveta University (Voi). The African Science Partnership for Intervention Research Excellence is another organisation involved in capacity development for PhDs is Afrique One-ASPIRE. In 2016 Afrique One-ASPIRE (African Science Partnership for Intervention Research Excellence) sought to recruit five postdoctoral research fellows, 15 PhD fellows and 18 master's fellows. Fellowships are designed to cover five thematic training programmes within the consortium. In this project, Kenya has two PhD fellows. Afrique One Alliance has the objective of building Pan-African research capacity in health.

Another innovative model is that of the *Consortium for Advanced Research Training in Africa* which has been supporting the development of PhD training in Kenya since 2010. It has so far trained over 140 PhD fellows and 24 doctoral students have already graduated from an innovative consortium arrangement built on a merit-driven system. This study noted that the training of doctoral and post-doctoral fellows adopts the use of joint advanced seminars. These are residential and planned to enhance the fellows' skills and knowledge. The course includes the preparation of fellows for the research process and guidance on how to establish a community of researchers, peers and mentors. It is noted that 'the formal trainings during JAS are

complemented by inter-JAS activities that encourage fellows to stay connected and engage with peers and mentors as part of an online community of practice and graduate in a timely manner'.

In addition to such innovative approaches, there are also regional discipline-based organisations such as the *Regional Universities Forum for Capacity Building in Agriculture* (RUFORUM) based in Kampala, Uganda which brings together 66 African universities operating within 26 countries to improve the quality of higher education at African universities by increasing the proportion of academic staff with PhD qualifications, contributing to locally relevant research and reducing the time away from the home institution. The specific objectives of the Graduate Teaching Assistants (GTA) are to:

1. Improve the quality of higher education and increase the pool of PhD-level trained academic staff in African universities.
2. Provide opportunities for the doctoral research to contribute more directly to African development.
3. Strengthen inter-university collaboration in the field of higher education in Africa.
4. Promote staff mobility among RUFORUM member universities, and across Africa.

## 7.4 Internationalisation strategies of Kenyan institutions

Otieno et al. (2008: 247) note that 'most universities in Kenya have had the experience of utilising these international collaborations for institutional capacity development and strengthening research capacity'. The various universities studied mainly displayed internationalisation in the following ways: student exchange programmes, faculty exchange, different levels of partnerships and linkages in research activities; and the establishment of campuses and university colleges both in different parts of the country and outside the country. For instance Kenyatta University, JKUAT and Mount Kenya University have established campuses in Rwanda. There are also growing numbers of international students in Kenyan universities including at PhD level especially from the neighbouring countries (Njuguna and Itegi, 2013). Kenya also hosts one of the Pan-African University Centres of Excellence based at JKUAT through which several students from Africa are trained at postgraduate level especially in STEM-related subjects.

## 8. Conclusion

The availability of PhD training in Kenya has witnessed growth over the last ten years with regard to the number and variety of PhD programmes being offered. The growth has been motivated by market demand for more highly trained manpower and the national need to expand higher education provision, leading to the establishment of more institutions across the country. Despite this growth, the number of PhD students remains relatively low.

The analysis of the different research priorities in the various institutions presents a common direction in research policies and procedures. Facilities for PhD training in most of the institutions are barely sufficient for effective training. Those that are available in each of the institutions vary greatly depending on the nature of PhD programmes being offered and other unique institutional factors. Furthermore, there is a lack of adequately qualified and experienced academic staff to effectively drive the process of PhD training and research in Kenya. In addition, the supervision process is challenged by varied institutional, supervisee and supervisor factors which slow down the process.

Despite the common PhD thematic areas of training in the various institutions of higher learning, there are variations which render each of the institutions sampled in the study unique. Unlike the similarities in the graduate training process, the nature and type of graduate programmes vary considerably depending on the academic thematic orientation of an institution. Some are determined by the geographical/physical setting of the university and others by the initial

mother institutions that led to their establishment. This provides for a variety of programmes from which the PhD applicants can select.

The research agenda of each institution is geared towards the attainment of the Kenya national research and development agenda as portrayed in Vision 2030, and adherence to the CUE regulations and the Universities Act 2012 on the provision of given graduate programmes. The study concludes that the introduction of new PhD programmes is a feature of academia driven by the institutions to meet the national research agenda, policy and strategy for development, such as Vision 2030, the MDGs and now the SDGs.

Based on the review of the research policies of the various institutions engaged in the study, there is visible evidence of efforts being made to link research activities and PhD training to the national agenda through the various national-level systems. Although not strong, evidence from this study indicates that universities in Kenya are strengthening the link between community, industry, institutions, and research and PhD training. We conclude that PhD training within the perspective of research for community development can help Kenya meet some of the goals expressed in the SDGs. However, as noted by some previous studies in this area, there is an urgent need for the universities to enhance collaborative research with research institutes in Kenya, namely KEMRI, International Centre of Insect Physiology and Ecology, KEFRI, International Livestock Research Institute, ICRAF, CIP, ICRAST, CABI and KARI (now KARL), among

others. This would enhance the use of research to meet the national and international agenda.

There are limited sources of funding to support and sustain PhD training in Kenya; consequently, it is apparent that all PhD students are required to put some private funds towards their studies or seek funding and scholarships at an individual rather than institutional level. The available grants or scholarships within the institutions are set aside for faculty who are pursuing their PhD programmes with a view to providing opportunities for staff development and capacity building within the institution. However, at national level some national agencies like HELB, NACOSTI and NRF make provision for limited PhD scholarships and research funds that are competitively awarded.

High-level research in Kenya is mainly funded from international sources. Good-quality PhD training has been a feature of collaboration with international networks or regional research centres highly dependent on international support. This, it is hoped, will change with allocation of more funds to NRF. It is important to note that most institutions primarily engage in collaborations for the purposes of international visibility and student exchange programmes and the other activities are built up as the collaborations become established. This suggests that programmes aimed at building PhD capacity can succeed in those instances where departments and faculties have pre-existing international links, and where they are supported by a clear institution-level internationalisation strategy.

# 9. Recommendations

The government and higher education institutions should take advantage of the current expansion of the higher education sector to build quality doctoral programmes, and to produce more doctoral graduates to bridge the current deficits in the system. Though staffing of the new programmes is a challenge, opportunities such as staff in the diaspora could be attracted back through better remuneration to fill in the capacity gaps at home. At the same time the government and the institutions must have it as a priority to train and retain high numbers of young scholars who can serve the system productively for a longer period of time.

In order to broaden the link between research activities and PhD training to the national agenda through various national-level systems, the scope of the research policies of the various institutions should be expanded to link directly to the national goals, focusing the provision on the specific aspects of the social pillar in Vision 2030 and on the SDGs. Government should have platforms for interactions with the universities to share their goals and aspirations which should guide universities on the expectations of governments. Such fora should also enable government to come to terms with the challenges and realities that universities face especially with regard

to research and PhD training. The exhibitions annually organised by the CUE provide a useful avenue for the universities to demonstrate to different stakeholders, including government, on the innovations they are making through their research.

It was noted that more than half of the PhD graduates in the system are from business and administration, the arts and social science disciplines. It was further noted that one of the reasons behind this was the high cost associated with establishing doctoral programmes in the natural science disciplines in addition to the deficits in staff capacities. Efforts should be made to ensure that more doctoral programmes are established in the science and technology areas which have not received adequate attention. As some respondents recommended, it would also be useful to adapt multidisciplinary research and training programmes for efficient sharing and utilisation of available capacities and also in response to labour market demands for complementary skills allowing for multi-tasking in the workplace.

Though there are a number of reforms underway, quality challenges still characterise PhD training in the system. While taking cognisance of the fact that these challenges are immense, universities could make improvements

in areas that are feasible even in the short term. Through CUE, the government has already taken useful steps, including closing down campuses that universities had set up across the country, and setting up regulations for academic staff qualifications and promotions, and guidelines on thresholds needed to set up new academic programmes among others. CUE now insists that institutions should ensure that the minimum quality standards are maintained and sustained. This has been extended to campuses outside the borders of Kenya: JKUAT have had to close their campus in Rwanda. This should be through different quality assurance frameworks in addition to an institutional infrastructure to support research, training and the needs of the PhD students. The institutions should further make efforts through the support of the government to develop or source more qualified academic staff to strengthen their academic quality. The staff should match the ratio of enrolled PhD students in order to enhance the quality and process of PhD training and research in Kenya. In addition, more stringent regulations should be set by the various institutions of higher learning to ensure the eradication of the challenges to the supervision process at all levels.

In order to provide a greater variety of PhD training options the higher education institutions need to differentiate and diversify their programmes to cover different but strategic areas, most of which may not be currently on offer. Each institution should explore and develop a unique edge in research and doctoral training. This may require that they review their strategies and plans to fit this recommended differentiation within the framework of the national agenda and the SDGs.

While Kenyan universities have created several international partnerships that have helped develop capacities for research and doctoral training, more could still be attained. University linkages and partnerships should lead to progressive and innovative institutions whose mandates are informed and enriched by the experiences, expertise and resources of these partners with a focus on PhD training and research advancement. The partners, on the other hand, will be able to gain by tapping the intellectual and creative energy of Kenyan universities. The overall achievement of these partnerships should be the production of more relevant knowledge and skills for social and economic development. Furthermore, there is a need to review

the legal framework, protocol and conventions that guide linkages with international research organisations to allow for more collaboration with the universities and for local researchers to do away with the disconnect between the local research environment and experts from international collaborations. There are several examples cited in the study demonstrating how such partnerships could enhance capacities for research and PhD training. Institutions of higher learning in Kenya should create more opportunities for international collaboration and widen the scope for engaging in these collaborations beyond international visibility and student exchange programmes in order to take advantage of other forms of collaboration inclined toward effective PhD training and the enhancement of academic staff development. Funding is a perennial problem facing the Kenyan higher education system, including its research and PhD training. While government is trying to support research and PhD training, these efforts are meagre compared to the existing needs. Kenyan universities must devise alternative ways of augmenting government funding. At the same time, the government has to give more concrete support to research and PhD training. The establishment of the NRF is a step in the right direction.

Universities need to work out ways of establishing dependable sources of funding that can be utilised to facilitate PhD students' training and research through the provision of scholarships for individuals. The available grants or scholarships for faculty who are pursuing their PhD programmes should be utilised to provide opportunities for staff development and capacity building to increase the number of qualified staff to engage in effective PhD training. In addition, national agencies like HELB, NACOSTI and NRF should increase their PhD scholarship and research fund awards.

The new development with centres of excellence in research and doctoral training is already starting to deliver formidable outcomes. Universities could maintain this trend and develop strategic consortia with partners with better capacities so that they can benefit from the synergies to train more doctoral graduates and also enhance research productivity.

# References

- Commission for University Education (CUE) (2015) Accredited Universities in Kenya. Available online at: [www.cue.or.ke](http://www.cue.or.ke)
- Commission for University Education (CUE) (2016) Accredited Campuses of Universities in Kenya. Available online at: [www.cue.or.ke](http://www.cue.or.ke)
- Elsevier and World Bank (2014) *A Decade of Development in Sub-Saharan African Science, Technology, Engineering & Mathematics Research*. [Working Paper No 91016.] Available online at: <http://documents.worldbank.org/curated/en/237371468204551128/pdf/910160WP0P126900disclose09026020140.pdf>
- INASP (2012) *Research Environment Study: Kenya, Malawi, Pakistan, and Bangladesh*. International Network for the Availability of Scientific Publications (INASP): Oxford
- Jowi, JO and Obamba, MO (2013) *Research and innovation management: A comparative analysis of Kenya, Ghana, and Uganda*. Report prepared by the African Network for the Internationalization of Education for the OECD: Paris.
- Kenya (2005) *Sessional Paper No. 1 of 2005 on the Policy Framework for Education Training and Research*. Nairobi: Government Printers.
- Kenya Government (2007) 'Kenya Vision 2030: A globally competitive and prosperous Kenya'.
- Kenya Government (2009) *National Science Technology and Innovation Policy and Strategy*. Nairobi: Ministry of Education Science and Technology (MoHEST).
- Kenyatta University Graduate School (2012) *A handbook for postgraduate students* (2nd ed.). KUP. Available online at: [www.ku.ac.ke/](http://www.ku.ac.ke/)
- Ministry of Education, Science and Technology (MoE) (2016) 'Kenya fast-tracks establishment of a national research fund'.
- Mukhwana, E, Oure, S, Too, J and Some, DK (2016) State of Postgraduate Research Training in Kenya. Commission for University Education. Discussion Paper 02. Nairobi, Kenya.
- National Assembly of Kenya (2012) Universities Act No. 42 of 2012. Nairobi: National Assembly.
- National Assembly of Kenya (2013) *Science Technology and Innovation Act 2013*. Kenya National Assembly.
- NEPAD (2010) *Africa Innovation Outlook 2010*. Addis Ababa: New Partnership for Africa's Development (NEPAD).
- Ng'ethe, JM, Iravo, ME and Namusonge, GS (2012) Determinants of Staff retention in public universities in Kenya: Empirical review. *International Journal of Humanities and Social Sciences* 2/13: 105–212.
- Njuguna, WF and Itegi, FM (2013) Cross-Border Higher Education in Africa: The Kenyan Experience. Available online at: <http://jeteraps.scholarlinkresearch.com/articles/Cross%20Border.pdf>
- Ogada, TM (2000) Universities, research and development organizations and intellectual property: General overview of the links between education, research, public interest and intellectual property right. Paper presented at Regional Seminar on the benefits of the intellectual property system for universities, university researchers and research and development organization. Dar es Salaam, Tanzania, 20–22 June 2000.
- Otieno, JJ, Kiamba, C and Some, DK (2008) 'Kenya', in Knight, J and Teferra, D (eds) *Higher Education in Africa: The International Dimension*. Accra/Boston: AAU/CIHE.
- OSSREA (2001) *The role of social science research in social, political, and economic transformation in Kenya*. A Report of a Workshop organised by the Organisation of Social Science Research for Eastern and Southern Africa.
- Public Universities Inspection Board (2016) *Transformation of higher education and training in Kenya to secure Kenya's development in the knowledge economy: report of the Public Universities Inspection Board*. Nairobi: Republic of Kenya.
- Republic of Kenya, (1981) *Second University in Kenya: Report of the Presidential Working Party*. Nairobi: Government Printers.
- Tijssen, RJW (2007) African contribution to the worldwide research literature: New analytical perspectives, trends, and performance indicators. *Scientometrics* 17/2: 303–327.
- UNESCO Institute for Statistics (UIS) (2007) *Global expenditure on research and development*. UIS Factsheet. Paris: UNESCO Institute for Statistics.









# RESEARCH AND PhD CAPACITIES IN SUB-SAHARAN AFRICA: NIGERIA REPORT

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# Foreword

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**This report forms part of a broader study commissioned by the British Council and the German Academic Exchange Service (DAAD) that surveyed research and doctoral training capacity in Sub-Saharan Africa.**

The study includes six country reports, namely Ethiopia, Kenya, Ghana, Nigeria, Senegal and South Africa. This report addresses the outcomes of the study in relation to Nigeria. The country reports include expanded contextualisation of the national research training landscape, while

a synthesis report is also available highlighting the key policy implications for PhD provision specifically. The aims of the study were to investigate: (i) the availability, quality and thematic priorities of PhD programmes and how they have changed over the last ten years; (ii) the national-level research agenda; (iii) the extent to which research training at the institutional level is aligned with the national agenda; (iv) national-level systems (policies, legislation) that facilitate alignment between institutional-level research training and the national

agenda; (v) how institutional priorities reflect the needs of universities and emerging research and development systems, including local industry and societal challenges; (vi) funding sources to develop and sustain PhD provision; and (vii) the role of international collaboration in building PhD capacity. The research, analysis, interpretations, conclusions and recommendations included in this report are those of the report authors.

# 1. The context of the higher education system in Nigeria

## 1.1 Historical development

The establishment of University College Ibadan (UCI) in 1948 from the relics of Yaba Higher College marked the beginning of fully fledged higher education institutions in Nigeria. Historically, the role of universities in Nigeria's development agenda has been acknowledged explicitly. Prior to independence in 1960, the Ashby Commission of 1959 had been tasked with reviewing Nigeria's higher education sector needs, and the commission recommended the establishment of additional universities to provide human resources for all sectors of the economy. With the increase in demand for university education, additional universities were established in the years that followed. By 1962 there were two universities owned by the federal government (Ibadan and Lagos) and three regional universities (Nsukka University, Ahmadu Bello University, Zaria, and University of Ife). The University of Benin was later established in 1972<sup>1</sup> by the then Mid-West Region, bringing the total number to six. These are known as the first-generation universities.

From six universities in the early 1970s, the number of Nigerian higher education institutions grew to 16 in 1980 and 51 by 2005. This phenomenal growth was partly supported by the wealth generated from the oil boom of that period and the directives of the authoritarian military regimes that characterised most of that period. By 2017, the number of universities according to the National Universities Commission (NUC) had grown to 40 federal universities, 44 state universities and 68 private universities (WES, 2017a).

## 1.2 Characteristics of the current higher education system

Nigeria is an ethnically, religiously and politically diverse country, and this is reflected in the diverse character of the country's education system. For example, the socio-economic and demographic profile of the states often determines access to higher education. The politics of the establishment of public universities in Nigeria is also in part a reflection of the country's economic and political diversity. Higher education in Nigeria is a responsibility of both the federal government and

the 36 state governments. In addition, private institutions are also allowed to operate. In terms of institution type, the tertiary level consists of the university sector, which is made up of universities. There is also the non-university sector, composed of polytechnics, monotechnics, colleges of education, specialised training institutes and technical colleges (Clark and Ausukuya, 2013). As can be seen in Table 1, just over a third of tertiary institutions are private (183), with the majority comprising public institutions (131 federal and 189 state).

Of African countries, Nigeria has the largest number of students enrolled in the higher education sector and the most institutions. By 2015 the total tertiary enrolment in Nigerian universities was 1.9 million, and the system is continuing to expand. A recent report has projected that the total higher education enrolment in Nigeria will reach 4.8 million by 2024 (ICEF Monitor, 2015). Table 1 shows the distribution of HE enrolments by institution type (universities, polytechnics, monotechnics, colleges, and vocational institutes). Comparable data is shown for 2015. The number of private universities has since grown slightly to 74 in 2017.

**Table 1:** Higher education enrolment in Nigeria by institution type, 2015

Type of institution	Federal	State	Private	Total	Enrolment	%
Universities <sup>i</sup>	40	44	69	153	1,131,312	58.4
Polytechnics <sup>ii</sup>	21	38	25	84	360,535	18.6
Monotechnics	23	2	2	27		
Colleges of agriculture	17	19	0	36	91,259	4.7
Colleges of health technology	9	40	1	50		
Vocational institutes	0	0	69	69		
Colleges of education <sup>iii</sup>	21	46	17	84	354,387	18.3
<b>Total</b>	<b>131</b>	<b>189</b>	<b>183</b>	<b>503</b>	<b>1,937,493</b>	<b>100</b>

Source: i NUC (2018a); ii National Board for Technical Education (2015); iii National Commission for Colleges of Education (2015).

1. The institute was founded in 1970 as an Institute of Technology. In 1971 it acquired university status, and in 1972 formally changed its name to University of Benin. In 1975 it changed from a State University to a Federal University.

### 1.3 Challenges related to capacity

Despite historical and continuing expansion of the higher education system, it cannot cope with the growing demand for students at both the undergraduate and postgraduate levels. It is estimated that the enrolment deficit in public universities is as large as one-fifth of the applicant cohort (Adedeji and Oyebade, 2016: 59), leaving many otherwise capable and qualified candidates searching for higher education elsewhere.

As a consequence of the capacity challenge, Nigeria is the leading African country sending students to study abroad, especially to European and American universities. By 2013, Nigeria had 71,350 degree-seeking students abroad (WES, 2017b). It is projected that by 2024, the UK will host 28,800 Nigerian postgraduates followed by the USA, which will host 7,600 of them.

One strategy in response to this challenge is building new higher education institutions. The federal government has already laid plans to establish six 'mega-universities' with the capacity to admit an additional 150,000 students each. In this way, the government expects to create additional capacity to admit approximately one million students annually. However, while the ambitious new flagship institutions can make an important contribution to the sector, large-scale infrastructural support is urgently needed to revitalise the existing public university system. Accordingly, the second strategy adopted by the government is to invest in the existing providers. The commitment by the government to spend \$223 million on refurbishing

six federal universities is a step towards the realisation of this goal (NUC, 2016). However, the realisation of this large-scale project in the future is still unclear (WES, 2017a).

Related to the issue of under-capacity, the Nigerian higher education system faces several challenges which have an impact on the ability of the institutions to realise their mandates, including for research and doctoral training. The system suffers from poor funding, collapsed infrastructure (especially in some of the first-generation universities), inadequate staffing, declining research productivity, governance and management difficulties, and challenges related to the quality of academic programmes. The political context of instability, frequent policy shifts and a lack of implementation of policies has resulted in frequent academic strikes (Albert, 2014).

The Nigerian government recognises a shortage in academic staff as a particular concern. Nigeria faces academic staff shortages in almost all disciplines, with the critical areas being those related to science and technology. In addition, there is also inter-sectoral brain drain that has drawn most doctoral graduates to other non-university sectors. To fast-track PhD training and research productivity, NUC has advised private universities to intensify their staff development drive to foster a healthy growth of junior staff within the system. All the universities, especially the first-generation universities, are encouraged to lay more emphasis on postgraduate training, which necessitates the employment of more lecturers at professorial level.

### 1.4 National bodies influencing the research training landscape

There are a number of significant national organisations that are not only important in the Nigerian higher education sector but also in research productivity and PhD training. One of these is the Ministry of Education, which has a supervisory role and is responsible for giving policy directives for different levels of the education system. With regard to the universities, the ministry gives policy directives and guidelines to the NUC. It is through the ministry that the NUC relates to the presidency (Faniran and Akintayo, 2012).

The NUC was established in 1962 as an advisory agency to the ministry responsible for higher education in Nigeria. Its main functions include granting approval for all academic programmes in Nigerian universities, and monitoring the establishment of all higher educational institutions. It is also responsible for quality assurance of academic programmes offered by Nigerian universities. The NUC also advises the government on financial needs of the universities in addition to being responsible for the planning and co-ordination of the development of university education in Nigeria. The NUC also disburses research funds to all the federal universities (NUC, 2005: 1). While it has made important contributions in strengthening the higher education system, the NUC has received some criticisms and complaints from different stakeholders in the system, especially due to its extensive and at times overbearing powers (Sijuwola, 2010).

While the NUC is responsible for quality assurance of universities, The National Board for Technical Education, which was established by Act 9 of January 1977, has among its functions the accreditation of academic programmes in all technical and vocational education institutions (tertiary technical institutions and technical colleges) and the recommendation of the establishment of private polytechnics and monotechnics in Nigeria.

The Joint Admissions and Matriculation Board is another key actor in the Nigerian higher education system. It was established by Decree No. 2 of 1978 to administer student admissions into Nigerian universities and other higher education institutions. It administers a centralised admission system of universities, polytechnics and colleges of education. It has to annually select the qualified students joining the universities based on their qualifications.

In terms of agendas and policies for higher education reform emanating from the institutions themselves, an important actor is the Academic Staff Union of Universities, which represents the aspirations of academic staff to other relevant stakeholders in the system. It has spearheaded several transformations in the higher education sector by demanding reforms ranging from enhanced funding of the universities, quality of programmes and autonomy of universities to better working conditions.

## 2. Methodology

In line with the aims of the study to capture a cross-section of diverse higher education institution types, ten institutions were selected for the study. The resulting sample comprised six federal and four state universities. To

ensure diversity, the sampling criteria included institutional type (federal, state or private), urban or rural location, religious or secular, and relative age (first generation or new). Consideration was also given to the different

geopolitical zones in Nigeria. Table 2 presents the profiles of the institutions selected for this study, including PhD enrolments and graduation figures. The data was collected from the institutions in 2016.

**Table 2:** Profiles of the sampled institutions

Institution	Type	Year of establishment	Location	Size (no. of campuses)	General student population	No. of PhD students enrolled
University of Ibadan	Federal	1948	South West	1	29,359	2,964
Nnamdi Azikiwe University	Federal	1992	South East	1	53,682	884
Enugu State University of Science and Technology	State	1982	South East	1	25,000	800
Ebonyi State University, Abakaliki	State	2000	South East	3	13,956	535
University of Jos	Federal	1975	North Central	2	20,753	324
Usman Danfodiyo University, Sokoto	Federal	1975	North West	5	6,500	115
Lagos State University	State	1962	South West	3	10,000	45
Benue State University	State	1992	North Central	7	6,500	38
Abubakar Tafawa Balewa University	Federal	1988	North East	8	8,000	21
Obafemi Awolowo University	Federal	1962	South West	1	32,000	n/a

Source: Data collected from the institutions in 2016.

During the research schedule in mid-2016, unforeseen circumstances arose preventing the full completion of the schedule for qualitative and quantitative data collection. Such conditions included the academic staff strike as well as political insecurity in parts of the country. Accordingly, the findings presented in this report refer

primarily to the desk review of available documents, policies and statistics at the national and institutional level. Where possible, data was also collected from the sampled institutions using questionnaires and semi-structured interviews from a purposive sample of participants with relevant experience to doctoral provision, namely registrars,

deans, heads of department and alumni. A detailed breakdown of these participants is provided below in Table 3. In order to provide national context to the institutional data and incorporate the government perspective, the study also included an interview with a representative of the NUC.

**Table 3:** Breakdown of the interview sample

School	Heads of department	Deans	Registrar	Alumni	Total interviewed
Nnamdi Azikiwe University	3	1	1	3	8
Enugu State University of Science and Technology	3	1	1	3	8
University of Jos	3	1	1	0	5
University of Ibadan	3	1	1	2	7
Benue State University	3	1	1	0	5
<b>Total</b>	15	5	5	8	33

Where relevant, we refer to these empirical findings in the report, but this data should be treated as indicative of preliminary findings, rather than providing a comprehensive or robust picture of doctoral provision. In particular, further research will be needed to identify the following

aspects of PhD capacity: (a) trends in thematic priorities in doctoral training; (b) PhD student throughput and completion rates; (c) engagement with industry and the private sector; and (d) the perspective of private higher education institutions.

# 3. Availability, thematic priority and quality of PhD provision

## 3.1 Availability and thematic priority of PhD provision

A number of transformations have taken place within the Nigerian higher education sector with regard to availability of doctoral programmes. The number of private universities has grown significantly over the past two decades from only three at the turn of the century to 68 in 2017 (WES, 2017a), and 15 of these private institutions are also offering PhD programmes. From only 38 universities (25 federal government-owned and 13 state-owned universities) approved to offer programmes at the master's and PhD levels in Nigeria in 2006, the number rose to 64 (26 federal, 23 state and 15 private) universities in 2012 (NUC, 2018b). To date, none of the Affiliated Colleges of Education and other institution types offer PhD programmes (*ibid.*). While this does demonstrate a new trend of private universities now offering PhD programmes as well, from the desk review undertaken, most private universities have not started offering PhD programmes. This may be due to the stringent requirements for establishing such programmes.

In addition to the higher education institutions mentioned above, there are also about 66 research institutes in Nigeria focused on scientific and technological areas which also support doctoral training. Most of them are affiliated to the universities and thus offer their programmes in collaboration with the universities. These institutes co-operate with the universities to support the training in different ways such as with their research infrastructure, which makes it possible for universities to expand their doctoral provision in the different areas. Table 4 depicts the distribution of these centres across the disciplinary focus.

**Table 4:** Number of research institute areas by disciplinary focus

Disciplinary focus	No. of research institutes
Science and technology	30
Agriculture	25
Education	4
Medical	4
Socio-economic and cultural	3

Source: Excellence and Education Network (n.d.)

Another important change that has been witnessed over the last decade is the growth in new modes of doctoral training, especially through collaborations with national and international universities. This is discussed further in Section 7 on the role of international collaboration in building PhD capacity.

An example of an institution at which significant progress has been made in postgraduate enrolments is the University of Ibadan. According to their director of research, while in 2012 the university had 5,749 postgraduate students, by 2016 the number had progressed to 12,948, which was almost equal to their undergraduate student population of 13,299. The goal of the university is to attain a 60:40 postgraduate–undergraduate enrolment in the next five years. Towards this goal, the university has established 394 postgraduate programmes with a focus on science, technology, agriculture, medical and health sciences, and has also developed joint master's and PhD programmes with partners especially in Europe. In 2015, the University of Ibadan graduated 265 PhDs (approximately 45 per cent in basic

and applied sciences, medicine and agriculture) and over 2,700 master's. The university also serves as West African hub for the Pan African Institute of Life and Earth Sciences, and has established the University of Ibadan Research Foundation to mobilise resources to support research and postgraduate training. It has developed several support systems for PhD students, which include the university scholars programme, postgraduate school teaching assistantships, international student scholarships, external grants fellowships and senate research grants. There is also a programme to maintain experienced faculty including retired professors. As a result, staff with PhD qualifications constitute 68 per cent of the total staff population.

The study was not able to identify thematic priorities of PhD programmes with the available data. It is the official policy as set out in the National Policy on Education that institutions have the freedom and the responsibility to teach and select areas of research. Further research is required, however, to establish the extent to which this has resulted in diversification and not duplication of PhD provision.

## 3.2 Quality-assurance provisions and practices in PhD training

### 3.2.1 Admission and overall structure

The basic entry requirements for PhD programmes in all the Nigerian universities are Final Cumulative Grade Point Average of 3.5 on a five-point scale for universities that run the point system, and 65 per cent for those that run the percentage system. This is in addition to possessing the stipulated O-level West African Examination Council requirements. In almost all the

courses offered in Nigerian universities, possession of O-level credits in English language and mathematics is compulsory, with only the exception of some pure arts courses where mathematics may be waived. Another internal quality-assurance mechanism introduced by some universities is the administration of a screening test to prospective postgraduate students. At Nnamdi Azikiwe University, for instance, the admission screening test comprises three parts, including a defence of the research proposal by the applicant.

PhD training in most Nigerian universities entails coursework, thesis writing and oral defence of the thesis. The student is required to take a minimum of nine credits and a maximum of 12 credits in courses deemed appropriate to their programme. These could be spread across two or more semesters depending on the candidate's mode of study, which could be full-time or part-time. In most of the universities, the minimum duration for full-time PhD studies is six semesters (36 calendar months) while the minimum for part-time studies is eight semesters (48 calendar months). Many universities such as the University of Nigeria, Nsukka differ on this as they still maintain the shorter minimum periods of 24 and 36 calendar months for full-time and part-time studies respectively, which used to be the norm.

### **3.2.2 Quality assurance and establishment of PhD programmes**

One of the quality-assurance processes adopted by the NUC to scrutinise universities and their programmes with the aim of determining the extent to which each institution is meeting or

exceeding the expected standards is accreditation. In Nigeria, undergraduate academic programmes are guided by the Benchmark Minimum Academic Standards, which was first published in 1989 and revised in 2007. However, there is no equivalent for PhD programmes in the country, despite attempts to launch this. Based on the responses from the university officers responsible for research, there is a need for a more clearly defined and nationally accepted set of criteria for evaluating PhD work. Respondents argued that the current method used by Nigerian universities which only provides a manual stipulating how research work is to be carried out merely serves as a guide on dissertation writing but does not show clearly the evaluative expectations of the research work.

To assure quality of programmes in private universities, the NUC established the Committee on the Monitoring of Private Universities to ensure that private universities operate within approved provisions. It also established the unit for resource verification for programme establishment that ensures that the universities have the human and material resources for establishing and sustaining their academic programmes. All the universities sampled in the study attested to the full accreditation of their postgraduate programmes and with established procedures for supervision, assessment, examination and graduation of students.

According to Okojie (2010), the proliferation of unapproved affiliations between Nigerian universities and non-university institutions for award of degrees has been a serious threat to quality. Over the years, several

Nigerian universities have also established their academic programmes without approval from the NUC, thus evading the requirements for setting up such programmes. Despite the NUC's efforts, there is also the challenge of establishment of satellite campuses across the country without the mandatory approvals from the NUC. Thus, the activities of illegal and unlicensed institutions continue to pose a challenge to the assurance of quality in the system. Some universities have signed memoranda of understanding with business entities to run training programmes in Nigeria, leading to students, even at postgraduate levels, attaining unrecognised qualifications.

### **3.2.3 Supervision of PhD students and PhD-qualified staff**

One potential challenge to quality identified in the literature on Nigerian higher education is adequate staffing to supervise doctoral students. It is a requirement that PhD training must be executed by teachers who are qualified to teach with the minimum qualification being a PhD degree and with the relevant experience. A study from 2011 (Tunde, 2011) reported that 21,350 out of the 35,000 lecturers in Nigerian universities (61 per cent) were found to still not have a doctoral degree. A 2012 report from the National Economic Empowerment and Development Strategy Committee established that 43 per cent of Nigeria's 37,504 university lecturers had PhDs (Clark and Ausukuya, 2013), suggesting that availability of potential supervisors is improving. The relatively small proportion of PhD-trained research staff can be traced back to the Nigerian era of military rule characterised by poor working conditions, which led

to demotivation and the best postgraduate students remaining in the diaspora (Tunde, 2011). To address the current shortage of PhD-qualified staff, the NUC declared in 2015 that a PhD will become the minimum qualification required to be engaged as a lecturer in Nigerian universities. As a result of this decision by the NUC, many young lecturers have registered for PhD programmes, so we can expect the number to grow in the near future. Gender disparities are also evident with regard to students admitted into doctoral programmes, with far fewer females than their male counterparts. The gender imbalance is even more pronounced in the science and technology disciplines (NUC, 2016).

The findings of the study showed that evidence of prior research publications was a prerequisite for postgraduate supervisors. At Nnamdi Azikiwe University for a member staff to be appointed a supervisor of postgraduate programmes, they are expected to have published at least three journal articles within the immediate past three years of their consideration and must be up to the rank of Lecturer 1 upwards to qualify for master's and PhD supervision (according to the university's guidelines for the School of Postgraduate Studies). Staff apply through the Postgraduate Board for Senate approval before being recognised as a postgraduate supervisor in writing by the University Senate. A senior lecturer does not supervise a doctoral programme unless they have previously and successfully supervised at least two master's degree students and must hold a doctoral degree. One supervisor normally is assigned to a candidate,

but where the area of research is interdisciplinary or where the research involves major and minor areas, as determined by individual departments, there may be more than one supervisor per candidate. Experts from other institutions/organisations may be appointed PhD supervisors as approved by the Postgraduate Board and ratified by the University Senate. As a matter of policy, universities usually approve a maximum of five supervisees to a supervisor except in special circumstances.

### 3.2.4 Alumni satisfaction

Alumni feedback that was collected for the study showed that the alumni were generally satisfied with the PhD programmes. At the same time, they felt that a number of aspects needed improvement, namely funding, infrastructure and quality of supervision. Due to the increasing numbers of students pursuing PhD programmes, neither the government nor the universities could afford to secure the funds to support the PhD students. Most of government funding to students was directed to the undergraduate level. As such most PhD students relied mainly on personal or family sources. Better infrastructure was desired especially in the science and technology subjects to facilitate meaningful training. Examples of infrastructure desired included computers and internet access. Alumni experienced challenges with supervision during their training, ranging from the issue of few supervisors being available, to cases where the supervisors were not well grounded in the area that they were supervising. In a few instances, the

quality of supervision especially with regard to feedback from the supervisors was seen as quite wanting.

Alumni demonstrated varied motivations for pursuing doctoral study. Though most of them were already in employment by the time they started their PhD training, they mainly undertook the doctoral training as it was a requirement of their work environment, not so much due to personal motivation. They however appreciated the links that were accorded to them by professional bodies that helped to sharpen the research skills through capacity-building seminars and workshops.

# 4. National research agenda and doctoral training

## 4.1 Defining the national research agenda

Since independence, national governments have continued to acknowledge the role of the higher education system in supporting economic and social development objectives. The Nigerian Educational Research and Development Council, established in 1988 by an enabling Decree No. 53 (now Act No. 53), was aimed at building and sustaining a culture of strategic educational research and development that would sustain the formulation and effective implementation of policies in education and in other related sectors of the economy. Research priorities have mainly comprised engineering, agriculture, education and social sciences (Okebukola, 2006). According to findings from a recent bibliometric study of science, technology engineering and mathematics (STEM) research output in Sub-Saharan Africa, health science and agriculture dominate research output (World Bank and Elsevier, 2014: 3). In the same vein, over the past ten years, health sciences and medicine have been important thematic areas for research in Nigeria with focus mainly being on Malaria, HIV/AIDS and maternal health. The 2009–2013 National Malaria Strategic Plan identifies operational research on malaria as crucial in informing continuous adjustment of policies and implementation strategies. Agriculture has also received attention and much of the research on this has been mainly led by the universities with a special inclination on agriculture such as Abeokuta University of Agriculture. Sustainable livelihoods have also been an area of continued focus in addition to the developments in science, technology and the industrial sectors.

### 4.1.1 Alignment between institutional research and the national agenda: the national perspective

Despite these positive examples above, the lack of strong alignment between institutional research activity and the national agenda has been criticised in Nigeria. The research literature on Nigerian higher education has drawn attention to an apparent disconnect between institutional research activity and national development objectives, owing to the absence of a clear national research agenda. Banji (2005) reported in his study that the bulk of the research engaged in by Nigerian universities is neither related to nor responded to the economic or societal demands of the nation. This is in agreement with Sijuwola (2010), who in his research identified systematic underfunding and disconnected research from the nations needs as key challenges to the higher education sector. Kayode (2016) points to the frequent power changes and politicisation as an obstacle, resulting in the lack of a consistent definition or philosophy behind the national development and research agenda.

In this context, the National Assembly of the Federal Republic of Nigeria enacted a bill in 2016 known as the National Research and Innovation Bill 2016. It provides for the establishment of the National Research and Innovation Council (NRIC) as well as the National Research and Innovation Foundation (NRIF). The functions of the NRIC, among others, is to set national priorities on research, innovation and development; and set directions to co-ordinate research and innovations generally (including research and development) in line with national priorities. The NRIF was established to draw up a national research agenda

based on the needs of the nation, make grants from the research fund and constitute a Research Proposals Evaluation Committee to process and approve applications for grants in accordance with the national research policy. Although it is too early to assess the impact of the NRIC, it is hoped that it may provide more clear and specific co-ordination of research activities, including doctoral training provision. By establishing key priority areas explicitly, it is also hoped that university education expenditure can be mobilised more easily for targeted research areas.

### 4.1.2 Alignment between institutional research and the national agenda: institutional experiences

The majority of the deputy vice chancellors and registrars interviewed were not aware of any national research agenda to serve as a guide for various universities' research focus. Data from the sampled institutions indicated that the decision to initiate or establish PhD programmes lay with the respective departments and faculties. The creation of new PhD programmes is informed by a number of institutional factors such as availability of qualified and experienced lecturers or supervisors in the faculty or departments and the relevance of the programme especially to societal needs and to the advancement of knowledge. The research priorities of the PhD students in turn were usually guided by their interests and career choices and not for the fulfilment of any national development or research agenda. In terms of external parties using research produced at tertiary institutions, it was observed that multinational donor agencies did turn to practical research reports that addressed specific policy problems.

## 5. Engagement with industry, the private sector and social challenges

Engagement with private sector stakeholders in research and PhD capacity building in Nigeria has been uneven. A study by the NUC in 2012 revealed that graduates from Nigerian universities lacked basic skills required in a modern working environment. The report recommended a review of curricula in the universities to align them with requirements of industry. On how responsive their PhD training is to the needs of the industries and the larger society, one deputy vice chancellor had this to say:

*'Well, irrespective of the fact that there are no institutional and national research agendas, our PhD programmes have always been responsive to the needs of the industries and trending issues in the society and provide research-based solutions to them. We encourage our*

*students that come up with such research interest that are action-based by approving them. Some of them who are lucky had received sponsorships and grants from them through our recommendations, though we have only witnessed few cases. For now, there is no established partnership between our PhD programmes and any industry in the area of research.'*

While links between universities and industry have been weak, there are positive signs beginning to emerge especially in the fields of agriculture, technology, information and communication technology, business development and medical science. In order to bring the university research and programmes closer to communities and stakeholders, the Nigerian

Universities Research and Development Fair exhibits innovative research projects from the universities, shares creative initiatives with communities and networks with other stakeholders. The sampled universities all indicated that they had outreach programmes with their local communities. Most universities provide student internships including with community organisations in addition to community-based projects.

# 6. Funding research and PhD training

## 6.1 National sources of funding

The federal government budgetary allocations to the education sector in general (primary, secondary, vocational and university combined) are relatively low, and have even experienced a decline in recent years. The allocations from 2013 to 2018 were 8.57 per cent (427.5 billion naira), 10.67 per cent, (495.3 billion naira), 10.75 per cent (483.2 billion naira), 7.9 per cent (480.3 billion naira) 7.4 per cent (455.4 billion naira) and 7.04 per cent (435 billion naira) of the total budgets respectively (Commonwealth of Learning, 2017; Sahara Reporters, 2017). The approved national allocations to the universities including for research is less than one per cent of the country's gross national income. Government funds for universities are channelled through the NUC to the 40 federal universities. Federal universities receive two types of grants from the NUC, i.e. capital and recurrent grants. It is within the recurrent grants that research funds are allocated.

In addition to the recurrent university budgets, another source of funding available to support and sustain PhD training in Nigeria is the Tertiary Education Trust Fund (TETFund).<sup>2</sup> The fund was set up to administer and disburse education tax collections by the Federal Inland Revenue Service to the federal and state tertiary educational institutions in Nigeria. The fund relies on the two per cent education tax paid from the assessable profit of companies registered in Nigeria. Part of the fund supports federal and state tertiary educational institutions for the provision and maintenance of postgraduate education, particularly at doctoral level in the following areas: essential physical infrastructure for teaching and learning; instructional materials and equipment; research and publication; and academic staff training and development.

In the context of reliance on government funding sources, which are considered inadequate (see Section 6.2), diversification to alternative sources of funding is encouraged. One of the ways through which the NUC is supporting the universities is the establishment of entrepreneurial centres in the universities to enable them to develop capacities for generating additional revenues that can support university programmes. Additionally, the Nigerian government initiated the University Hostel Development and Management Initiative policies to enable universities to channel more resources towards teaching, learning and research as well as policy initiatives on funding that would separate the cost of academic activities from the regular overhead costs through the creation of a separate budget for Direct Teaching and Laboratory Cost. However, data available for this study could not illustrate the current proportion of these respective sources of income at the institution level.

The study identified several sources of funding that target research or doctoral research specifically. The government introduced a Central Research Fund to fund and support top-quality multidisciplinary research in the universities for national development. The Nigerian Universities Doctoral Theses Award Scheme was also established to encourage high-quality research among doctoral students in Nigerian universities. Another scheme is the Special Doctoral Studies Scholarships for University Teachers, which is part of the efforts to improve the quality of teachers in the Nigerian universities by supporting them for PhD training. Another significant initiative is the Virtual Library Project, which is aimed at connecting the libraries in Nigerian universities to ease access to library materials. There are also several partnership initiatives with different

international agencies and national corporations such as the National Petroleum Corporation. Despite these efforts, the sharp drop in oil prices, the mainstay of Nigeria's economy, has negated some of the gains made and even led to fees increases in 2016.

## 6.2 Institutional experiences of funding

Institutional responses for this study indicated that the approved allocations from the NUC are usually much lower than the proposed budgets from the universities, leading to inadequate research funding. However, data was not consistently available across the institutions to give a comprehensive view of the situation. A relevant point raised by the interviewees was the fact that the NUC mainly uses student enrolment figures as a basis of funding allocation, which has made it difficult for most of these universities to engage in a long-term plan for research and doctoral training.

In terms of funding for PhD students, some of the universities sampled offer a 50 per cent rebate on tuition fees to their staff on doctoral training as part of staff development. This was quite helpful as was affirmed by respondents from the University of Jos. They also responded that the TETFund allocates more funding support for staff on doctoral programmes in engineering and science-based disciplines than their counterparts in humanities and non-science-based fields of study. Other funding sources, such as the Petroleum Development Trust Fund and the National Scholarship Board, provide scholarships to some graduate students. All of the respondents acknowledged that funding challenges are general and persistent across the institutions.

2. The TETFund was established by an Act of the National Assembly in June 2011. The Act replaced the Education Tax Fund Act Cap. E4 laws of the Federation of Nigeria 2004 and Education Tax Fund (Amendment) Act No. 17, 2003.

# 7. The role of international collaboration in building PhD capacity

## 7.1 Collaboration beyond Sub-Saharan Africa

International collaborations present one of the ways of enhancing doctoral training and research productivity in Nigeria. Nigerian higher education institutions have a long tradition of productive partnerships dating back to the colonial times. The main impacts have been through training abroad in specialised areas, scholarships for PhD students, staff development programmes, joint research studies and publications, joint supervision of PhDs, working with international partners to develop new PhD programmes in Nigerian universities and sharing of training resources such as laboratories and other science equipment.

A national-scale initiative for international collaboration in doctoral training is found within the Petroleum Development Trust Fund aimed at training PhD students in reputable institutions within Nigeria through split programmes involving a Nigerian university and a foreign one with the student spending some time in each institution. Selected candidates must be a member of academic staff in any of the Petroleum Development Trust Fund upgraded universities. The primary objective of the programme is to produce more PhD graduates. At the same time, the aim is to build capacity in the Nigerian higher education sector by providing joint PhD research training at a foreign university and the designated Nigerian universities, and in turn fostering collaborative research and exchange between academics in Nigerian and foreign universities.

Over the past ten years, one of the notable changes in relation to doctoral training and research is an increase in collaborations between Nigerian universities and institutions outside Nigeria. From the sampled institutions, there were several collaborations with international universities. For example, Nnamdi Azikiwe University and Alexandria University, Egypt, have established a joint master's degree in higher education management. The international office at the University of Ibadan has created several partnerships to support research and doctoral training. The funding for scholarships and for the University of Ibadan Foundation were mainly from international sources.

Nigeria also hosts a number of international universities, such as the American University at Yola, which has direct relationships with several other American universities which could be used to create more opportunities for PhD training.

## 7.2 Collaboration within Sub-Saharan Africa

The expansion of intra-African engagements in trade and investment shows that Nigeria is one of the four strongest African countries to lead Africa's revitalisation of higher education (Zezeza, 2016), with the ambition of developing a stronger, diversified and research-based higher education system that can also serve its neighbours. A recent bibliometric analysis of STEM research output in Sub-Saharan Africa revealed that the region of West and Central Africa is

indeed characterised by a higher degree of intra-regional research collaborations compared to the regions of East and Southern Africa (World Bank and Elsevier, 2014: 6). One example of an intra-African collaboration is the Centre for Drug Discovery, Development and Production at University of Ibadan. The centre is collaborating with Kilimanjaro School of Pharmacy, Tanzania, Bosch and African Population and Public Health, Kenya. Nigerian institutions also play an active role in the African Centres of Excellence (ACE). These are research centres which function as regional hubs for specific research areas, all related to the fields of agriculture, health sciences and STEM. Six of the 15 centres in the West and Central Africa zone are hosted by Nigerian universities: ACE for Genomics and Infectious Diseases (hosted by Redeemer's University, Osun State); ACE for Neglected Tropical Diseases and Forensic Biotechnology (hosted by Ahmadu Bello University, Zaria); ACE in Phytomedicine Research and Development (hosted by University of Jos); ACE in Oilfield Chemicals Research (hosted by University of Port Harcourt); ACE in Reproductive Health Innovation (hosted by University of Benin, Edo State); and the OAU ICT-Driven Knowledge Park (hosted by Obafemi Awolowo University, Ile-Ife) (Association of African Universities, 2018). The University of Ibadan is also part of the African Research Universities Alliance, which focused on research and the production of new-generation African scholars.

### 7.3 Internationalisation of research staff

West and Central Africa have a relatively lower proportion of visiting scholars and international collaborations compared to East and Southern Africa (World Bank and Elsevier, 2014: 6). Currently, there are two main schemes in place on a national scale to encourage the internationalisation of research active staff in Nigerian higher education. First, Nigeria maintains the Nigerian Expatriate Supplementation Scheme, through which expatriates are

attracted to Nigerian universities at better remuneration than local staff. Second, in order to further encourage internationalisation of research activity in Nigerian higher education, the Linkages with Experts and Academics in the Diaspora Scheme was established by the NUC in 2007. The diaspora programme is limited to professors or researchers and a time period of three to 12 months. Its main aim is to attract experts and academics of Nigerian extraction in the diaspora on a short-term basis to contribute to the enhancement of education in the

Nigerian university System. Data collected for this study from the University of Ibadan and Nnamdi Azikiwe University suggested that the diaspora experts have supported the establishment of new PhD programmes, and participated in joint research and supervision of PhD students.

## 8. Conclusion

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Nigeria faces the serious challenges of funding, quality of programmes, inadequate qualified staff and poor infrastructure for research, which slow down the progress that could be made regarding PhD training.

While several policy documents could be identified, it was difficult to identify a national policy agenda for research. There were discipline-based agendas, but no overarching national research agenda. NRIC as well as NRIF may serve to address this gap, and build on the strategic work currently taking

place at the level of disciplines. However, it is too early to evaluate its implementation or impact. As such, the universities developed their institutional research agendas based on institutional priorities. PhD programmes were largely developed through institutional efforts but based on regulations from the NUC and other regulatory bodies. Findings for this study suggest that quality still remains a major challenge as suggested by interviews with the NUC and with institutional leaders. Internal quality-assurance mechanisms will need to be strengthened.

Nigerian universities had strong international partnerships that could be used to strengthen research and doctoral training. The size of the Nigerian sector and its regional interconnectedness mean that it is in an advantageous position to develop into a strong knowledge system that could have an impact not only nationally but also for Sub-Saharan Africa.

# 9. Recommendations

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- Nigeria could consolidate and expand the capacities of the existing universities rather than creating many new ones. The research and PhD production capacities of existing universities could be enhanced by building in more quality and relevant new PhD programmes.
  - The existing national research agendas at the discipline level could be consolidated to develop a national agenda for research and PhD training. This could be helpful for institutions in shaping their research priorities and aligning doctoral training more clearly with national development goals.
  - There is need for engagement with industry and the private sector, both in terms of setting research priorities and funding. Currently, there is a degree of private sector financial support indirectly via the TETFund tax, which goes towards quality enhancement of Nigeria's higher education staff and institutions more generally. However, there is still scope for the private sector to contribute in more direct ways to PhD provision. The universities should aggressively seek other sources of revenue to tackle the infrastructural challenges through partnership with the private sector and public-spirited philanthropists.
  - The universities in Nigeria should initiate further policies to address the issue of human capacity challenges, because the issue of brain drain has heavily affected the Nigerian higher education system. As discussed in the report, there are programmes to involve the Nigerian diaspora into the system. In addition, efforts should be made to improve working conditions in the universities to stem the outflow of researchers and potential PhD students. Such policies could target the high numbers of Nigerian students studying abroad.
  - While the government requirement for all staff in universities to have a PhD could address the capacity challenge, it is uncertain if this is desirable or feasible. There are disciplines such as medicine and law where most staff rarely attain a PhD. These professions also offer better opportunities in private practice. If the government is to uphold this requirement, then adequate supportive mechanisms for staff, especially early-career staff, to attain PhDs need to be put in place.

# References

- Adedeji, SO and Oyebade, SA (2016) 'In pursuit of graduate employability and inclusive development in Nigeria: realities and expectations', in British Council (ed) *Universities, employability and inclusive development: Repositioning higher education in Ghana, Kenya, Nigeria and South Africa*, 57–75.
- Albert, IO (2015) Beyond Moral Panic: Negotiation Theory and the University Strikes in Nigeria. *Journal of Global Initiatives* 9/2: 81–98.
- Association of African Universities (2018) ACE institutions. Available online at: <https://ace.aau.org/ace-institutions/>
- Banji, FJ (2005) *University research capacity in Nigeria and the challenges of national development in a knowledge-based economy*. Paper presented at the 11th General Assembly of CODESRIA, on Rethinking African Development, Beyond Impasse: Towards Alternatives. Maputo, Mozambique, 6–8 December 2005.
- Clark, N and Ausukuya, C (2013) An overview of education in Nigeria. *World Education News and Reviews*. Available online at: <http://wenr.wes.org/2013/07/an-overview-of-education-in-nigeria>
- Commonwealth of Learning (2017) *Open Educational Resources Policy for Higher Education in Nigeria*. Burnaby: Commonwealth of Learning. Available online at: [https://oerknowledgecloud.org/sites/oerknowledgecloud.org/files/2017\\_Agbu-Mishra\\_Open-Educational-Resources-Policy-for-Higher-Education-Nigeria.pdf](https://oerknowledgecloud.org/sites/oerknowledgecloud.org/files/2017_Agbu-Mishra_Open-Educational-Resources-Policy-for-Higher-Education-Nigeria.pdf)
- Excellence and Education Network (n.d.) Research Institutes in Nigeria. Available online at: [http://exced.ucoz.com/index/research\\_institutes\\_in\\_nigeria/0-69](http://exced.ucoz.com/index/research_institutes_in_nigeria/0-69)
- Faniran, JO and Akintayo, DI (2012) Moral authority, leadership integrity, and management of conflicts in the Nigerian University system. *Asian Journal of Business & Management Sciences* 2/1–6. Available online at: [www.ajbms.org/articlepdf/1ajbms2012210421.pdf](http://www.ajbms.org/articlepdf/1ajbms2012210421.pdf)
- ICEF Monitor (2015) Nigeria projected to be one of the world's fastest-growing markets for postgraduate studies. ICEF Monitor, 2 February 2015. Available online at: <http://monitor.icef.com/2015/02/nigeria-projected-one-worlds-fastest-growing-markets-postgraduate-studies/>
- Kayode, David Jimoh (2016) Relationship between distributed leadership, quality administrative and academic processes and institutional effectiveness in public universities in Nigeria. PhD thesis, Universiti Utara Malaysia.
- National Board for Technical Education (2015) Directory of accredited programmes in polytechnics, technical and vocational institutions in Nigeria. Kaduna: NBTE.
- National Commission for Colleges of Education (2015) List of colleges of education in Nigeria.
- NUC (2012) Labour Market Observatory Report. Available online at: <http://nuc.edu.ng/wp-content/uploads/2016/02/LMOP-Report-Manufacturing-Sector-2012.pdf>
- NUC (2016) *NUC Parastatal SERVICOM Committee: 2016 Annual Report*. Available online at: <http://nuc.edu.ng/wp-content/uploads/2017/08/2016-NUC-PSC-Report-ilovepdf-compressed.pdf>
- NUC (2018a) List of Nigerian universities and years founded. Available online at: <http://nuc.edu.ng/nigerian-universities/federal-universities/>  
<http://nuc.edu.ng/nigerian-universities/state-university/>  
<http://nuc.edu.ng/nigerian-universities/private-universities/>
- NUC (2018b) Approved Universities to Run Postgraduate Programmes. Available online at: <http://nuc.edu.ng/approved-universities-to-run-postgraduate-programmes/>
- Nigeria National Assembly (2016) National Research And Innovation Bill, 2016. Available online at: [www.nass.gov.ng/document/download/8317](http://www.nass.gov.ng/document/download/8317)
- Okojie JA (2010) System and strategies for funding Nigerian universities.
- Okebukola, P (2006) Principles and policies guiding current reforms in Nigerian universities. *Journal of Higher Education in Africa/Revue de l'enseignement supérieur en Afrique* 4/1: 25–36.
- Sahara Reporters (2017) Full Text Of President Buhari's 2018 Budget Speech. *Sahara Reporters* 7 November 2017. Available online at: <http://saharareporters.com/2017/11/07/full-text-president-buhari%E2%80%99s-2018-budget-speech>
- Sijuwola, A (2010) 'Funding: A Vexed Issue in University Education, in Okojie, J, Oloyede, I and Obanya, P (eds) *50 years of University Education in Nigeria: Evolution, Achievements and Future Directions*; Ilorin: University of Ilorin and National Universities Commission.

Tunde, F (2011) NIGERIA: Urgent need for more academics with PhDs. *University World News*, Issue 201. Available online at: [www.universityworldnews.com/article.php?story=20111209195021937](http://www.universityworldnews.com/article.php?story=20111209195021937)

WES (2017a) Education in Nigeria. Available online at: <https://wenr.wes.org/2017/03/education-in-nigeria>

WES (2017b) African Student Mobility: Regional Trends and Recommendations for U.S. HEIs. Available online at: <https://wenr.wes.org/2017/03/african-student-mobility-insights-and-recommendation-for-u-s-heis>

World Bank and Elsevier (2014) *A Decade of Development in Sub-Saharan African Science, Technology, Engineering & Mathematics Research*. Working Paper No. 91016. Available online at: <http://documents.worldbank.org/curated/en/237371468204551128/pdf/910160WPOP126900disclose09026020140.pdf>

Zezeza, PT (2016) 'The Role of Higher Education in Africa's Resurgence', Eric Morobi Inaugural Memorial Lecture University of Johannesburg, 15 October, 2016. Available online at: <https://www.uj.ac.za/newandevents/Documents/2016/UJ%20Keynote%20Higher%20Education%20and%20Africa's%20Development%20Agenda.pdf>





# RESEARCH AND PhD CAPACITIES IN SUB-SAHARAN AFRICA: SENEGAL REPORT

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# Foreword

**This report forms part of a broader study commissioned by the British Council and the German Academic Exchange Service (DAAD) that surveyed research and doctoral training capacity in Sub-Saharan Africa. The study includes six country case studies covering Ethiopia, Kenya, Ghana, Nigeria, Senegal and South Africa.**

This report addresses the outcomes of the study in relation to Senegal. The country reports include expanded contextualisation of the national level context and policies for research

training,<sup>1</sup> while a synthesis report is also available highlighting key policy implications for PhD provision specifically.<sup>2</sup> The aims of the study were to investigate: (i) the availability, quality and thematic priorities of PhD programmes and how they have changed over the last ten years; (ii) the national-level research agenda; (iii) the extent to which research training at the institutional level is aligned with the national agenda; (iv) national-level systems (policies, legislation) that enable alignment between institutional-level research

training with the national agenda; (v) how institutional priorities reflect the needs of universities and emerging research and development systems, including local industry and societal needs; (vi) funding sources to develop and sustain PhD provision; and (vii) the role of international collaboration in building PhD capacity. The research, analysis, interpretations, conclusions and recommendations included in this report are those of the report authors.

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1. Country reports can be found on the British Council website <https://www.britishcouncil.org/education/ihe/knowledge-centre/developing-talent-employability/phd-capacities-sub-saharan-africa> and the DAAD website <https://www.daad.de/en>
  2. Synthesis report can be accessed on the British Council website at <https://www.britishcouncil.org/education/ihe/knowledge-centre/developing-talent-employability/phd-capacities-sub-saharan-africa>; and the DAAD website <https://www.daad.de/download/phd201806>

# 1. The context of the higher education system in Senegal

## 1.1 Historical development

The history of higher education in Senegal dates back to 1957 when the University of Dakar, currently known as the University Cheikh Anta Diop de Dakar (UCAD), was established. It is the oldest Francophone university in Africa. For several years from its inception the university was affiliated to the University of Paris and the University of Bordeaux. This was mainly due to Senegal's history of French colonial rule, which aligned its higher education system to the French model, including the strong responsibility of the state in providing education to its citizens. This affiliation to the French model continued after independence in 1960 until 1972, when some reforms were introduced in the higher education system. These reforms followed in the aftermath of the violent socio-political protests of 1968 after which the Senegalese government, among other changes, initiated the 'Senegalisation' of the University of Dakar. One of the key changes was in staff composition, which led to the recruitment of more Senegalese staff into the university. The other was the change in the academic programmes which were then mostly programmes of the affiliated French universities. The university embarked on efforts to develop programmes that were relevant to Senegalese society.

The 1980s and 1990s were also marked by continued calls for reforms in the Senegalese higher education sector by international organisations like the World Bank and the International Monetary Fund. These reforms were applied in the context of Structural Adjustment Programmes. They had enormous impacts on the higher education sector, some of which were detrimental to student and staff welfare. This period also coincided with the onset of the sharp rises in student enrolments at the university. By this time – three decades after independence – the Senegalese higher education system was limited to UCAD. This meant serious capacity crises as student numbers grew over the years. Consequently, under-capacity led to the establishment of the University of Saint-Louis (now University Gaston Berger (UGB)) in 1990, and the creation of another three new universities in 2007, namely the University of Thiès (UT), University Alioune Diop of Bambey (UADB) and University Assane Seck of Ziguinchor (UASZ). At the same time, from the 1990s, private universities have been allowed to operate in Senegal. By 2016 there were 75 higher education institutions authorised by the state. Most of them are management schools with a capacity of about 200 students each. A further way the government is addressing the capacity challenge is investment in non-traditional and e-learning avenues, for instance through the creation of

the Senegalese Virtual University, which specialises in online courses. Other Senegalese universities are also trying to develop online teaching models.

Nonetheless, research undertaken for this study revealed that several structural issues deriving from under-capacity continue to pose challenges for the higher education system overall. They include overcrowding, especially in public universities, leading to students lacking access to basic facilities and resources, inadequate facilities, inadequate levels of academic staff (especially those with PhD qualifications), inadequate funding and weak regulatory frameworks especially for strengthening governance and academic quality. As an illustration of the situation in public universities, by 2016 UCAD had a student population of 79,943 in facilities designed to accommodate fewer than 30,000 students.<sup>3</sup> It is not the sheer numbers that is the challenge but the lack of capacity to deal with the growing numbers.

Doctoral training and research in Senegal have also faced related challenges. The capacity for doctoral education in Senegal has not expanded over the years to levels that are commensurate with the expansion of higher education in the country and the attendant need for doctoral graduates in the country's higher education sector and other knowledge-related sectors.

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3. According to an interview with colleagues from the Directorate of Research and Statistics at UCAID, 2016.

## 1.2 Current research and doctoral training landscape

The government of Senegal holds research and knowledge production as key for the future development of the country. Senegal's Poverty Reduction Strategy Paper (International Monetary Fund, 2013) underscores the role of higher education in knowledge production and research for societal development. As such, the government has been deliberately involved in the development of proactive policies for the higher education sector that includes research and the development of doctoral education in Senegal.

A range of national policies have defined the Senegalese higher education system, leading to several transformations over the years. An important actor in the formulation and execution of these policy reforms has been the Ministry of Higher Education and Research. Apart from the periods 1983–86 and 1995–2000, when the government included a ministry of scientific research with full powers, research has often been attached to other departments. However, since 2000, the purview of research falls under the Ministry of Higher Education and Research, which develops the national research policies and strategies for the education sector and oversees the bulk of the research in universities<sup>4</sup> and also focuses its priorities on addressing other educational challenges.

The two main stakeholders in the research system in Senegal are CAMES (African and Malagasy Counsel for Higher Education) and ANAQ-Sup (National Quality Assurance Authority of Higher Education). While the first is 'an advisory, monitoring, facilitation and integration body of higher education and research in the African and Malagasy francophone systems',<sup>5</sup> the second is in charge of assuring quality in private and public higher education institutions. Among the reforms to be introduced in 2017 in the mission of ANAQ-Sup, the quality assessment of research is of crucial importance.

It is also notable that apart from the nationally driven reforms, reforms have also been driven by regional associations, mainly the West African Economic and Monetary Union (WAEMU) made up of eight Francophone and a few Lusophone countries. Through this avenue, the bachelor's-master's-doctorate system was adopted in 2007 to improve efficiency, quality, recognition of qualifications and closer collaborations between institutions in the region including for the mobility of students and staff. It also facilitated the setting up of national qualification frameworks. Therefore, programmes aiming to support PhD capacity in Senegal should take account of any existing networks with member countries in these kinds of regional associations, and how these may provide opportunities for staff mobility or for influencing policy formation more generally.

Doctoral education in Senegal is regulated in Law No. 2011-05 of 2011, which stipulates that the doctorate is a 'postgraduate higher education degree certifying a level corresponding to obtaining 180 credits after the Master's degree and gives its holder the Doctor's degree'. It views doctoral studies as training in research through research. This principle has always guided the organisation of doctoral studies in Senegal.

The provision of doctoral education via research-focused doctoral schools was further reinforced by the 2012 LMD reform. This marked the adoption of the structure of *licence-maîtrise-doctorat* (LMD), meaning bachelor's-master's-doctorate. Accordingly, Senegal now organises higher education in a three-cycle system as in most countries. The 2012 LMD reform also led to reforms in the structure of doctoral education in Senegal. Doctoral education remains an exclusive responsibility of graduate schools in Senegalese universities. The operation, regulatory requirements, role definitions and organisation of doctoral studies, as well as the requirements and structure of the doctoral programmes, are stipulated in the decree on the doctorate (Law No. 2011-05). Graduate schools are structured and located within tertiary institutions authorised to award doctorates, especially those with research teams, requisite infrastructure and facilities able to support the teaching and supervision of doctoral students and sustain the quality of the programmes.

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4. Under the supervision of the Ministry of Higher Education and Research, this role is now devoted, since September 2014, to the Research General Directorate. The latter is composed of four main directions all dedicated to helping the universities and research centres enhance research activities for pro-development results.

5. CAMES' Strategic Development Plan 2015–2019.

These graduate schools manage multiple responsibilities including the academic and administrative requirements of doctoral programmes such as admission to programmes, support systems for students, organisation of seminars, academic development of doctoral students, organisation of defences, mentoring doctoral systems and support for professional integration, among many other functions.

Before the implementation of the LMD reforms, doctoral training in Senegal was largely dependent on the French 1967<sup>6</sup> FOUCHET reform which established the doctorate first degree (*doctorat de 3ème cycle*) and the doctorate second degree (*doctorat d'État*). This degree is essential in arts and sciences to obtain the rank of professor. In addition, this architecture includes various other qualifications such as Diplomas of Higher Studies and the Diploma of Specialised Higher Studies<sup>7</sup> (Ndiaye, 2011). The requirement of the doctorate first degree was a major stumbling block in the career of scholars, especially in the humanities and social sciences. This factor was the main justification for the implementation of the LMD

reform to also facilitate the recognition of Senegalese degrees internationally and promote student mobility, accelerate the professionalisation of education and increase the PhD production capacities of Senegalese universities (Ministry of Higher Education and Research, 2013). In order to achieve these objectives, the doctorate first degree and doctorate second degree were removed. This led to the establishment of a new and single doctoral qualification referred to as the PhD.

With the implementation of the LMD reform, the PhD has become the minimum requirement for employment as a teacher-researcher in public universities. Before this requirement became compulsory, the DEA (postgraduate diploma) provided access to a first academic career through the assistant grade. However, it should be emphasised that local PhD holders face strong competition from those who studied at overseas (French, Canadian or American) universities. The last of these hold a 'competitive edge' because of the prestige, quality and reputation associated with their degree and scientific output.

Currently, there is only a small market or demand for those with doctoral qualifications within Senegal, and limited employment opportunities for PhDs. Many doctoral graduates are employed as contract or part-time lecturers and researchers while waiting for full-time permanent positions. The study on obstacles to employment among doctoral graduates in Senegal conducted by the Social Policies Research Centre, which is affiliated to UCAD, revealed that 86.4 per cent of respondents considered the university as the only employer of young doctoral graduates. Only six per cent of respondents felt they could find opportunities in other sectors such as industry and in NGOs; (Doucouré, 2014). Figures from 2010 show that almost 94 per cent of the country's researchers worked within the universities, with four per cent in government institutions, 0.84 per cent in non-profit organisations and only 0.08 per cent in private enterprises (UNESCO Institute of Statistics, n.d.).

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6. The law that fixed the functioning rules of UCAD was issued in the same year. Twenty-three years later, the law governing UGB's creation was inspired by the same legal text. This shows a certain uniformity in the management system of Senegalese public universities as influenced by the French one.

7. Senegal's official journal, 25 June 2011, Bill No. 2011-05 of 30 March 2011 on the organisation of the LMD system (bachelor, masters and doctorate) in higher education institutions.

## 2. Methodology

In line with the aims of the study to capture a cross-section of diverse higher education institution types, ten higher education institutions were selected for the study. To ensure diversity, the sampling criteria included the number of doctoral programmes in the institution, research productivity,

geographical location, institutional type (i.e. public or private), staff and student profiles as well as status in rankings. Based on these factors, five public universities and another five private universities were selected for this study. The profiles of the sampled institutions are presented in Table 1.

It is important to mention that due to lack of proper institutional data tracking mechanisms both at institutional and national levels, this study faced serious challenges in obtaining relevant and current data.

**Table 1:** Profiles of the sampled institutions

Institution	Status/type	Location	Year of establishment	No. of students	No. of PhD students enrolled in 2015–16	No. of PhD students graduated 2015–16
UCAD	Public	Dakar	1957	79,943	1,252	217
UGB	Public	Saint-Louis	1990	11,159	625	25
UASZ	Public	Ziguinchor	2007	3,480	60	2
UT	Public	Thiès	2007	2,500	80	12
UADB	Public	Bambey	2007	2,487	0	0
Superior Institute of Management	Private	Dakar and 13 regions of Senegal	1992	3,500	0	0
African Institute of Management	Private	Dakar	1996	1,400	25	0
Sup de Co	Private	Dakar	1993	<1,000	4	0
African Centre for Superior Studies in Management	Private	Dakar	1985	1,300	13	0
School of Tourism and Languages	Private	Dakar	2006	<150	0	0

Source: Data collected by research team from the institutions in 2016.

Data was gathered from the above institutions using desk research, questionnaire surveys and interviews from university directorate staff, deans and heads of department, PhD candidates and alumni. A detailed

breakdown of the questionnaire respondents and interviewees is provided in Table 2. In order to provide cross-sector context to the institutional data, we also conducted five interviews with stakeholders outside these

institutions, namely from the Employers' Confederation of Senegal (two interviews), the National Council of Employers, a representative of an NGO and a CEO of a manufacturing company.

**Table 2:** Summary of data collection

Institution	University directorates		Deans and heads of department(s)		Alumni		University directorates	DVC and registrars	PhD candidates	Alumni
	Sent	Valid Received	Sent	Valid Received	Sent	Valid Received				
UCAD	2	2	7	4	15	10	3	5	8	5
UGB	2	2	4	3	18	11	2	2	5	4
UT	1	0	1	1	0	0	1	1	0	0
UADB	0	0	0	0	0	0	0	1	0	0
Superior Institute of Management	1	0	1	0	0	0	1	1	0	0
African Institute of Management	1	1	1	1	0	0	2	1	1	0
Centre for Advanced Studies in Management	1	0	1	0	0	0	0	0	0	0
Sup de Co	1	0	1	0	0	0	1	0	0	0
School of Tourism and Languages	0	0	0	0	0	0	1	1	0	0

# 3. Availability, thematic priorities and quality of doctoral training

## 3.1 Availability and thematic priorities

A number of challenges face doctoral training in Senegal, including opportunities for employment for new PhDs; inadequate finances to support doctoral students; challenges to set up new doctoral programmes; lack of multidisciplinary research teams; poor links of doctoral programmes to labour market demands; ageing qualified faculty members reducing the capacities for supervision of doctoral students; increasingly high dropout rates among PhD candidates and longer time taken to attain the PhD qualification than the prescribed period; and the persistence of traditional practices<sup>8</sup> in the organisation and management of PhD programmes which do not allow for flexibility and the interests of diverse students groups. There are also serious gender disparities, with most doctoral students being male.

Despite these challenges, the Senegalese higher education system has some strengths within its research and doctoral training systems. Compared to its neighbours, Senegal has a long tradition of doctoral training with a diversity of themes covered by the doctoral schools, organised in a national network of doctoral programmes. Doctoral schools have signed partnerships not only with private and public institutions but also with foreign universities to facilitate scientific mobility and promote mutual research programmes. The establishment of new regional universities expanded opportunities for doctoral training to several other parts of the country, away from Dakar, where for several decades UCAD had been the only doctoral

training institution in the country. The new efforts in implementing doctoral programmes in private universities in partnership with public universities oriented towards new training needs (e.g. PhD in Business Administration) is also beginning to bear fruit and is contributing to diversifying the provision of doctoral training opportunities.

This study noted that UCAD, the oldest and largest university in Senegal, had seven doctoral schools with an enrolment of 1,252 doctoral students in the 2015–16 academic year. UCAD leads in research productivity in Senegal, accounting for close to 90 per cent of the country's research publications. Growth in the number of thesis defences from 2008 to 2015 at this institute is represented in Table 3. The second largest university, UGB, had 625 PhD students enrolled and 25 graduated in the 2015–16 academic year. This is an enrolment increase of more than three-fold since 2005. Details of UGB enrolments are depicted in Table 4.

**Table 3:** Number of thesis defences at UCAD, 2008–15

2008–09	1
2009–10	48
2010–11	70
2011–12	113
2012–13	169
2013–14	183
2014–15	170

Source: Directorate of Research and Statistics, UCAD, 2016.

**Table 4:** Growth in doctoral student enrolments at UGB, 2005–15

2005–06	188
2006–07	215
2007–08	325
2008–09	359
2009–10	515
2010–11	642
2011–12	622
2012–13	657
2013–14	624
2014–15	610
2015–16	625

Source: Directorate of Education, Guidance and Statistics, UGB, 2016.

As can be seen in the tables above, enrolments in UCAD and UGB have been stagnant in recent years. This trend is in part due to a quota established for professors authorised to supervise theses, of a maximum of ten doctoral students per teacher (before the number was not limited). At the same time, there are many retirements of professors whose offices have not been filled. There is a lower rate of supervision which significantly reduces the possibilities of doctoral enrolment.

8. We consider persistence of a hierarchical system, the lack of promotion of the scientific autonomy of students, and the theoretical orientation of theses with a tendency to address general themes and not articulated to practical questions as examples of this.

While it was not possible to collect comprehensive data on thematic priorities of doctoral research nationally or at all the ten sampled institutions, disciplinary trends can be surmised for UCAD in Table 5. As UCAD is the largest producer of doctoral research in the country, trends in doctoral research there serve as a useful indication of the

national picture. Contrary to findings from a recent bibliometric study of science, technology, engineering and mathematics (STEM) research output in Sub-Saharan Africa (World Bank and Elsevier, 2014: 3), health science and agriculture do not dominate in Senegal, at least at the level of doctoral research output. Rather, STEM subjects are

distributed fairly evenly between health, environmental and life sciences, and mathematics, physics and other STEM subjects. A notable trend is the large share of enrolments in management, economic, and political and legal sciences (about a third of enrolments from 2010 to 2014).

**Table 5:** Number of PhD enrolments by discipline at UCAD, 2008–15

Year	Doctoral schools							Total *
	Environmental, Health and Life Science	Studies on the Human Being and the Society	Arts, Cultures and Civilisations	Water Quality and Water Use	Mathematics and Computer Science	Physics, Chemistry, Earth and Universe Sciences and Engineering	Management, Economic, Political and Legal Sciences	
2008–09	119	135	NR	NR	NR	NR	ND	254
2009–10	167	118	NR	NR	NR	NR	ND	285
2010–11	236	113	281	58	181	262	646	1,777
2011–12	295	143	205	63	164	276	625	1,771
2012–13	302	157	172	55	147	140	509	1,482
2013–14	327	191	203	49	159	180	494	1,603
2014–15	305	255	172	49	159	168	361	1,469
2015–16	266	ND	NR	42	170	188	586	1,252

Source: 2015–2016 Inquiries, UCAD, DAP.

NR: No responses (doctoral schools had not collected the relevant data for that year).

ND: No data available, either because: (i) doctoral school not open yet (2008–09 and 2009–10); (ii) data from the various programmes had not been synthesised.

\*Although the total number of enrolments appears to have dropped in 2015–16, interviews with staff indicated that the figure actually increased if the missing data for ETHOS and ED-ARCIV are taken into account.

Our interviews with the heads of various graduate schools and departments indicated that they mainly utilise trans-disciplinary approaches which bring departments and faculties together as part of a doctoral school. Most graduate schools bring together a set of doctoral programmes with related specialisations to create a multidisciplinary scientific environment. The interviewees indicated that this was important in enabling them to address some of the capacity challenges within the institutions. This growth of trans-disciplinary relations between doctoral departments has facilitated opportunities for the sharing of resources, research facilities, funding and supervision capacities that has enabled the production of doctoral graduates to rise, especially in recent years. This is one of the innovative approaches to addressing the research and doctoral training deficits in Senegal.

Despite the progress made by private higher education institutions, public universities are still the main producers of PhD graduates in Senegal. It was notable that the majority of private institutions mainly offer programmes for first and second cycles of the MBA degree. This could be because of regulatory requirements for programmes and also their lack of adequate capacities to introduce other programmes which demand more infrastructure. Some institutions such as Sup de Co or the Centre for Advanced Studies in Management have developed ways of dealing with such constraints by collaborating with national universities (mainly UCAD and UGB) or foreign universities to establish doctoral programmes.

### 3.2 Quality

Senegal has attempted to put in place quality-assurance frameworks to strengthen its research and PhD training at system, institutional and student levels. Following the implementation of the LMD in 2012, the doctoral programmes are subject to the regulatory and accreditation mechanisms of ANAQ-Sup. This authority has exclusive responsibility in terms of accreditation and institutional recognition of training programmes in both public and private universities. It is the first step in the recognition of the training and qualifications. Apart from ANAQ-Sup, there is CAMES, which has even more stringent requirements especially with regard to the supervision and quality of doctoral studies. Assessing the quality of doctoral programmes in Senegal focuses mainly on elements such as the description of the regulations monitoring the doctoral student and the support of the employment of persons with PhDs, the duration of relevant doctoral programmes, and additional courses, seminars and workshops organised to support doctoral students. It further considers the objectives of doctoral training in the different units and whether these objectives are being met.

Interviewees and respondents for this study noted that there have been some major changes in doctoral training in Senegal over the past ten years. One of the main changes was the introduction of more flexibility into PhD programmes especially after the implementation of the LMD reforms in 2012. At the same time, the selection criteria for PhD

programmes became more rigorous and were mainly based on the CAMES standard. It was also noted that the quality-assurance management systems of doctoral programmes improved as a result of the ANAQ-Sup and CAMES regulatory frameworks.

There are also governance reforms within the higher education sector which are attempting to distance the system from the French model towards a newer public management approach that is expected to bring more efficiency and better governance models into that system which could have positive impacts on research and doctoral training. Evidence of this was the involvement of people from the private sector in the public universities management system, with the reform of the university system of governance expected to be managed by a board chaired by an actor from the socioeconomic sector.

Regarding structure, the Senegalese system has coursework that usually covers 60 credits, while the writing and defence of the thesis account for 120 credits. The doctoral schools have scientific councils responsible for the development and adoption of internal rules and regulations, the examination of PhD applications, the establishment of new doctoral programmes and research projects as well as the approval of budgets for the doctoral school. The councils also have an executive body consisting of the head of the doctoral school, a scientific secretary and a representative of each specialty who undertake some of the administrative tasks on behalf of the council within the regulatory provisions.

The graduate schools aim at creating optimal conditions to increase the enrolment and graduation of doctoral students, and to promote research and collaborative relations between departments and within Senegalese universities.

Unlike the old training system where the student after the validation of their research topic and the choice of their mentor worked in relative isolation throughout their doctoral studies, the current system seeks to break this isolated approach. Accordingly, it promotes the organisation of doctoral seminars to provide PhD students with an opportunity to overcome their isolation and be monitored more regularly. While this change is promoted, it is not felt in reality by doctoral students who responded to our surveys. According to them the thesis continues to be an exercise carried out in 'solitude'. Discouragement and a lack of motivational incentives are significant

barriers to the perseverance and retention of doctoral students. Even though they find it very demanding (compared to the former one), a majority of students think this system is highly favourable to enhance the quality of their PhD productions, namely through the permanent involvement of external collaborators from external laboratories and state-owned or private companies. This, to some extent, brings their research works closer to development needs and facilitates their professional integration. What stood out in the experiences of doctoral students especially at UCAD were the doctoral training seminars in which leading scholars and experts were invited to guide and mentor doctoral students in different fields.

In addition to possible isolation of PhD researchers, a further challenge cited was supervision. The system does not have adequate supervisors for the PhD candidates. This clogs down the

supervision cycle as one supervisor has to attend to a large number of students in addition to their other duties such as teaching. This led to long waiting times to meet supervisors and finally leading to delays in graduation. This has led to some PhD students being caricatured by undergraduate students as 'eternal students who do not want to get out of the campus' as cited by one UCAD PhD candidate. The new regulations for PhD supervision allow one professor to be responsible for a maximum of ten doctoral students in a year, which may alleviate this problem in the future. However, this is still quite a high number of students per supervisor and has implications for the quality of supervision.

## 4. National research agenda and doctoral training

### 4.1 Defining the national research agenda

As summarised in the Senegal Poverty Reduction Strategy Paper (International Monetary Fund, 2013), Senegal has committed to promoting research and development in national priority areas by progressively increasing the research and development budget and promoting different forms of international collaborations for research and making full use of research results. In addition to the LMD reform discussed in the preceding sections, the Decadal Education and Training Development Programme has also led to significant reforms in the research training system. This was developed in line with the Educational Policy Letter 2000–17, and called for the promotion of research as a crucial lever for the economic and social development of Senegal. It encompassed a special emphasis on science and technology, although overall progress towards the achievement of this objective remains slow. From 2007 to 2012, when the implementation of the LMD reform started in Senegal, research was the responsibility of the Ministry of Higher Education and Research. However, some aspects of research fell into other relevant line ministries such as Agriculture and Rural Equipment, Industry and Mines, Health and Social Action.

These reforms have led to the reorganisation of the Senegalese higher education and research system in different ways. One of the structural reforms was the creation of the office of Director General of Research within the Ministry of Higher Education and Research with the responsibility and mandate of facilitating, advancing and managing research in Senegal.

The other development was the establishment of the National Research Scientific and Technical Centre responsible for the management of research and co-ordination of some national and mutualised research centres. The government also created a National Fund for Research and Innovation (FNRI) to fund priority research areas and expanded the mandate of ANAQ-Sup to oversee the quality of university education and research. In the Decadal Education and Training Development Programme, formulated in line with the Educational Policy Letter 2000–17, and the Strategic Development Plan of the Ministry of Higher Education (2013–17), another important package of measures was also enumerated. These included the definition of a strategic research agenda specified in a law which sets out the priorities for the next ten years, and the creation of the Strategic Council for Research under the authority of the prime minister.

In addition to the above developments, the Senegal Emerging Plan – which has been the reference document of Senegalese authorities on research – was another important boost to the management and support of research in Senegal. The Senegal Emerging Plan summarises Senegal's development priorities and projections to be achieved by 2035. Most national development agendas including education and research have to be aligned to this vision. Though our review did not identify a singular document defining Senegal's research priority, this document provided important insights. National research priorities could also be found in the Strategic Development Plan for Higher Education and Research 2013–17 which was adopted by the Ministry

of Education and Research in 2013. Among other things, the plan specifies priority research fields to which universities and other research institutions have to focus attention. In addition to this plan, there are also more sectoral strategies for the promoting of research. Much priority for research is in the fields of health, food security, agriculture, climate change, energy, and information and communication technology.

### 4.2 Alignment between institutional research priorities and the national agenda

Research in Senegal remains fragmented at the institutional level. In part this reflects the diversity of actors involved in co-ordinating research at the national level, with the main actors being the Ministries of Higher Education and Scientific Research, Agriculture and Rural Equipment, and Health. In the field of agricultural research, the Senegalese Institute of Agricultural Research falls under the Ministry of Agriculture and Rural Equipment. The Institute of Food Technology depends on the Ministries of Mining and Industry, Food Processing, Agricultural Products and Small and Medium Enterprises. There are also some international centres or national research centres with international collaborations in research such as the Development Research Institute (environment and resources, health and societies), the Pasteur Institute (public health, epidemiology and bacteriology) and the International Centre for Agricultural Research for Development. It is clear from the above that there is a need for more co-ordination and frameworks for the governance and management of research in Senegal.

As noted in the above section, no single document was found containing a national research agenda for Senegal. However, the policy documents collectively underscored the fact that much priority for research is in the fields of health, food security, agriculture, climate change, energy, and information and communication technology. This is given more clarity within the stipulations of the Fund for the Development of Scientific and Technical Research (FIRST<sup>9</sup>), which was established in 2007. The fund awards research grants to faculty and researchers as well as PhD students. (The FIRST Fund is discussed in more detail in Section 9.) Since the last

national consultation on the future of higher education, new orientations in the national policies place great priority on the promotion of research in the STEM fields. In this respect, all the existing PhD programmes and new ones are required to be elaborated in line with the national policy of development and on the demand of the private sector. This has been especially so for the public universities.

Meanwhile, the private institutions find it rather difficult and even inefficient to adopt the same practices in this respect. Instead, they seem much more concerned with the relevance of research themes to the needs of the

employment market. In Sup de Co, for example, the selection criteria for PhD careers refer to two main aspects: *excellence and relevance* – an excellent application (with outstanding scores in a master's) and a relevant research theme to present development needs. Aligning research programmes to STEM subjects has been a challenge especially due to the capacity requirements of these programmes and the fact that most of the existing programmes are in the social sciences.

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9. In French: *Fonds d'impulsion de la Recherche Scientifique et Technique*.

# 5. Engagement with industry, the private sector and social challenges

## 5.1 The need for greater engagement with local industry

Based on its French tradition, higher education (including doctoral training) in Senegal historically had mainly followed the vocational mode, which created a link with the industrial sector as most trainees would fit there. However, in recent years there have been calls for more theoretical programmes, which are also being viewed as important as they make a contribution to this dimension of knowledge. A new brand of doctoral programmes is thus developing with a focus on STEM, as has been discussed in relation to the national research agenda. The theoretical programmes, however, limit the chances of the universities to have meaningful engagements with the industry and at times the general private sector. An exception is the Institute of Food Technology, which develops applied research for the benefit of industrial agribusiness. In general though, universities do not have fruitful links or engagements with the industry and private sectors. An associate professor from University Alioune Diop of Bambey cited the following reasons: (a) lack of interaction between the university and their local contexts; and (b) lack of stakeholder involvement in designing programmes, including a lack of industry and private sector involvement. Professionals rarely teach in Senegalese universities. Most of the time, professional training is carried out without prior exposure to the field, for example via internships or other relevant work experience.

As mentioned in Section 2.2, the overwhelming majority of doctoral graduates are employed in the higher education system. The private sector presents opportunities but mostly in certain fields such as agronomy,

environment, natural sciences and biomedical sciences. Data collected for this study showed that the majority of doctoral students were within the arts and humanities, with significantly fewer numbers in the STEM subjects. This could explain why there was not much integration of graduates into the industrial sector, where appropriate skills in sciences or business are required.

However, efforts are being made at the institutional level to address the lack of higher education–industry engagement. The setting up of incubators in most public universities is a relevant illustration of this new orientation. Private companies and private individuals can now offer expertise and specific training to students through specialised agreement frameworks. In some cases, students find their first internship thanks to those contacts. These efforts should be seen in the context of the constraints that researchers face in their challenges to get promoted and the conditions they have to meet in order to be promoted, which do not encourage industry-oriented activities. In fact, in French-speaking countries, CAMES is responsible for promoting lecturers based on their scientific production. That process is very important insofar as it motivates the activity of research by lecturers, whose ambitions can only be fulfilled through the focus on scientific production at some point. The success of institutions in their attempt to take the activity of research to another level that can help them generate prominent industry-relevant results must be supported by the stakeholders, namely the National Council of Employers and Employers' Confederation of Senegal. Thus, the private sector needs to work alongside the university by providing them with the means. This approach will benefit both parties.

A further illustration of this orientation towards industry is a recent reform affecting public universities. As of 2017, they will be administered by boards involving actors from the private sector, business communities, local government, professional corporations, including employers' organisations such as the National Council of Employers, Senegal's Movement of Enterprises, the Confederation of Senegalese Employers, and the National Union of Industry Owners and Tradesmen.

From the industry perspective, knowledge and research outcomes from the universities were not utilised especially due to a lack of relevance to the industry needs. A respondent from a manufacturing company in Dakar indicated that due to the low interaction between the two sectors, universities were not aware of the needs of industry and vice versa. There were no forums in which the two sectors could interact. The research conducted in universities and higher education institutions as a whole was not accessible to the industry nor was it suitable for addressing the issues of the industries. This disarticulation explains why Senegalese universities have been cartooned as 'factories to produce unemployment' – turned in on themselves and not open to the external environment. However, it should be noted that ineffective collaboration between universities and the business world was presented as a handicap mainly in the context of the public universities only. The new stipulation to include industry and professional representation in the governance structures of public universities may help to alleviate the current lack of engagement with industry needs.

## 5.2 Addressing societal challenges with private sector collaboration

As mentioned in Section 5.1, public universities and dependent institutions of ministries have set up incubators whose aims are, among others, to use research output to give impetus to social and economic innovations. One of the most well-known projects is the so-called PRODAC,<sup>10</sup> whose implementation is related to research results in the fields of agronomics, aquaculture and aviculture. These are important structures that can assist researchers to promote and share the results of their research.

National companies in particular can benefit from the findings of research, provided that they logistically support those researchers by co-operating with the institutions that employ them. An illustration of a company benefiting directly from research activity at a doctoral centre was cited by a company representative from the field of water treatment. They have representatives on the scientific committee in a doctoral school that specialises in the treatment of water and that is carrying out important research in the field. It is indeed through co-operation of this kind that Senegalese universities can play their role in the dissemination and

development of research findings. It is also a means to reinforce the relationships between universities and industry, thereby participating in the economic development of the country. Related to this point, it will become increasingly important to ensure that the country has a quality-assurance agency that can ascertain the quality of the findings of research on the national and institutional level.

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10. *Programme des domaines agricoles communautaires* (National Programme for Agricultural and Community Fields).

# 6. Funding research and doctoral training

## 6.1 National and international sources of funding

Funding has already been cited as one of the main challenges facing the Senegalese higher education system and its knowledge production system (Hathie, 2009). The Senegalese higher education system was for a long time highly subsidised by the state, but this picture has changed. Currently, research funding comes mainly from two sources, namely, the state (47.61 per cent) and from international sources (40.53 per cent), with the business sector contributing only 4.09 per cent.<sup>11</sup> While previously institutions charged no tuition fees and students benefited from government bursaries and subsidised accommodation, registration fees were introduced in 1994.

Despite a restrictive budgetary context, the government has implemented a national research funding mechanism through the Ministry of Higher Education and Research. The ministry has two major levers of research funding which include doctoral training. One is FIRST, which was established in 2007 to award research grants to faculty, researchers and PhD students. For example, in 2014, 13 research projects were funded for a total of 209,917,788 FCFA (about \$359,808). The FIRST research priorities are health, food security, agriculture, climate change, energy and the digital economy. The FIRST will be replaced in the near future by the FNRI, with a larger budget and more regular funding that will focus on the financing of innovation. (At the time of writing, the FNRI is yet to be implemented, so FIRST currently remains the main government mechanism for funding research.) The second research

funding mechanisms is an initiative to support the promotion of female researchers and teacher-researchers, which only funds projects that may enable women from educational and research institutions to advance in their career (publications, invitations to scientific meetings and participation in thesis juries) or to complete their doctoral thesis in Senegal. The Ministry of Agriculture also shares responsibility for funding research. It administers the National Agricultural and Food Research Fund dedicated to research projects in the fields of agriculture, livestock, fisheries, agro-industry, water and forestry, hydraulics and environment.

According to most heads of the doctoral programmes consulted in this study, they nonetheless felt that their responsibility was to a great extent undermined by the current levels of state funding,<sup>12</sup> leading to stagnation of possible advancements that could have been made in certain strategic fields. To address this need, almost all heads of doctoral schools in the four public universities (UCAD, UGB, UT and UASZ) resort to external partners for research funds. In this regard, the University Agency of the Francophonie has become a key partner of doctoral schools to finance scientific mobility programmes and research stays for doctoral students. Graduate schools are using co-operation agreements and partnership projects with foreign universities as leverage for logistical, financial or additional scientific resources (access to databases, hosting visiting professors, summer schools, thematic seminars, scientific workshops and subscriptions to online magazines).

In addition to institution-level efforts to attract external sources of funding, the government is also making efforts to do so, with some successful projects having come from the World Bank, the Islamic Development Bank and the African Development Bank, which have played a key role in funding the sector. These include examples such as scholarship programmes in agriculture, and funding of research centres of several countries researching the same topic.

## 6.2 Institutional and student experiences related to funding

From the interviews with the directors of research in the top two research and PhD producing universities, UCAD and UGB, it was noted that a serious lack of financial resources was a major handicap to production of more PhDs and research outcomes. The context of 'massification' of students, especially at the bachelor's level, had stretched institutional funds, leaving research and doctoral education struggling. According to the heads of the doctoral schools consulted in our sample, university research budgets were considered insignificant or difficult to access. For example, thesis defences can sometimes be repeatedly postponed because the means to support the combined costs of participation of an external examiner from abroad (e.g. airfare and living expenses) are not available. The scarcity of funds also leads to competition rather than collaborations between researchers as they had to compete for the meagre research resources. The trend among the university teaching staff is to neglect basic research in favour of a greater investment in financially profitable consulting studies.

11. Ministry of Higher Education and Research (2013).

12. Information collected during the ordinary meeting of the Pedagogical and Scientific Board of the Doctoral School on 30 November 2016.

From the perspective of doctoral students, funding was also cited as a challenge. This was despite the fact that financing of doctoral programmes in Senegalese public universities, where most doctoral training takes place, is largely provided by the state. PhD students pay an annual registration fee of 75,000 FCFA (about \$128). Prior to this amount being set in 2013, doctorate registration fees had for several decades remained the same at the higher rate of 150,000 FCFA (about \$250). PhD training in Senegal is hence relatively affordable. Moreover, PhD candidates can benefit from financial support through the national programme of doctoral grants, and there is a scholarship system for doctoral students. (There is no student loan system as part of the financial aid provided.) The generalisation of PhD scholarship was decided during the year 2000. This decision was a powerful incentive for the doctorate and has created a boom in the demand for doctoral studies. This situation can be summarised by the expression 'the thesis for all'. The amount of the

government scholarship is 60,000 FCFA per month (\$97 per month) for at least three years. An inscription guarantees access to monthly income, social status and professional opportunities (other scholarships, teaching tasks and research contracts) and the benefit of social services (accommodation and meals at modest amounts). According to the findings of this study, most PhD candidates meet the costs of their studies through a combination of state scholarship, temporary teaching contracts and consultancy work. This suggests that the scholarship forms one essential component of doctoral researchers' income. This financial support to doctoral training, among other factors, may be having a positive impact on graduation rates. As can be observed in Table 3, graduation rates at UCAD increased substantially between 2008 and 2015. As shown in Table 4, UGB has also witnessed a substantial rise in doctoral student enrolments; the figure has risen three-fold from below 200 in the 2005–06 academic year, to above 600 from 2010 onwards. If the current

level of financial aid were not in place, it is unclear whether the same growth in number of enrolments and graduations would have been achieved.

While funding was considered a constraint according to a majority of the interviewed PhD alumni and PhD candidates, it was also noted that some private universities such as the Centre for Advanced Studies in Management, for instance, where the doctoral programme enjoys more autonomy than in any other non-state institution, research programmes benefit from different sources of funding, like the WAEMU member states or the Central Bank of West African Countries. WAEMU has an annual Support for Training and Research Excellence programme, which covers installation costs, allowance for insurance and living allowances for doctoral students in each of its eight country members, through an annual competition.<sup>13</sup> Thus, it was felt that this institution stands today as offering the most efficient research programmes among non-state universities and schools.

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13. [www.uemoa.int/fr/bourses/bourses-dexcellence](http://www.uemoa.int/fr/bourses/bourses-dexcellence)

# 7. The role of international collaboration in building PhD capacity

## 7.1 International collaboration beyond Sub-Saharan Africa

The internationalisation of higher education could play an important role in strengthening institutional capacities for research and doctoral training. The International Association of Universities (2010) has recognised this point as the main rationale for African universities to engage with internationalisation. Senegal's universities likewise pursue internationalisation for this reason. All public universities which were part of this study have a director or a vice-president in charge of international co-operation. It was noted that international collaborations in the institutions took different dimensions including exchange of researchers, joint academic programmes, mobility of students and staff, institutional strengthening projects and joint supervision of doctoral students. Due to the colonial history, France has been a dominant player in international collaboration with Senegalese universities. For example, the two French institutions the Centre for Agronomic Research for Development and the Research Institute for Development are international research centres based in the country.

One example of this at the doctoral research level is the GHI and Sorbonne Political Research Centre, Dakar, which offers an innovative doctoral training programme accompanied by scholarships for doctoral degrees attainable at UCAD. The programme is also open to students from France and Germany, thus opening opportunities for knowledge-sharing between doctoral candidates from different countries.

In recent years, other countries have also gained prominence in collaborations with Senegalese universities. The USA is now a very active player especially in the field of agricultural research through the USAID-Education Research in Agriculture, whose aim is to strengthen the capacity of Senegal in training in agronomy. Other partner countries are Canada, Switzerland, Germany (through DAAD), the UK (through the British Council), Belgium and recently Asian countries such as China, Japan and South Korea. Other examples are programmes like the Swiss–African Research Cooperation building Swiss–African links, and the Austrian-led APPEAR<sup>14</sup> partnership. UCAD runs a number of academic partnership projects with other international universities, including Wells College, Indiana University, the University of Oregon (all from the USA) and several other partnerships with European universities. Most of these involve doctoral training and joint research.

## 7.2 International collaboration within Sub-Saharan Africa

Senegal still plays a crucial role in the development of research and doctoral training, especially in Francophone Africa. Its strong relationships with other international universities open up more opportunities even for universities in the neighbouring countries. Regionally, Senegal has played an important role in hosting students from French-speaking countries, especially within the framework of CAMES. Most Francophone African countries have always considered Senegal

as a high-quality system with good public and private programmes. This is highlighted by the diversity and huge number of foreign students at UCAD and UGB. In 2016, according to the Directorate of Studies and Statistics, at UCAD, foreign students were 3,882 out of a total of 79,943 or 4.8 per cent of the total student population. At the same time, in UGB, there were 667 students out of a total of about 10,000 students (6.6 per cent). Of these foreign students, 140 are enrolled in doctoral studies.

With regard to the development of PhD programmes in partnership with Sub-Saharan African countries, co-operation programmes with African countries are set up within the framework of organisations such as WAEMU and the Economic Community of West African States and with neighbouring countries. Research is not only conducted at Senegalese public institutions, but also with foreign private institutions especially from France. The creation of the Network for Excellence of Higher Education in Africa in 2007 triggered new forms of co-operation that enabled African member universities to propose harmonised doctoral training programmes. As a key member of the network, Senegal plays a prominent role in the preparation of joint PhD projects in the fields of information technology and mathematics. The Centre for Excellence in Mathematics and Information Technologies, which was recently opened in UGB, is a relevant illustration of the achievement of this model of co-operation between African countries by developing programmes geared mainly to applied research.

14. APPEAR: Austrian Partnership Programme in Higher Education and Research for Development.

WAEMU is increasingly looking to position itself as an institution that contributes to the promotion of academic research in the eight member countries through a programme called PAES/UEMOA.<sup>15</sup> The funds for these programmes are awarded each year according to a competitive selection for scholarships and research grants to individual researchers and research laboratories.

UCAD has partnerships with several other universities in Africa. One of the most notable was its being a member of several university associations and networks which have been useful in expanding research frontiers and strengthening doctoral training. It is also a member of the recently launched African Research Universities Alliance, which brings together 14 African universities from eight countries to unite their distinctive fields of expertise

to achieve complementary and co-ordinated programmes of research and training. The alliance is committed to the development of Africa's knowledge base through research and doctoral training. Due to its international collaborations and regional reputation, UCAD has a diverse student population, with international students coming from several other countries in the region and beyond.

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15. In French: *Programme d'appui à l'enseignement supérieur et à la recherche* (Support Programme to Higher Education and Research).

## 8. Conclusion

The study notes that though Senegal still has a very small postgraduate education sector in its higher education system, the sector is growing and this has been mainly due to government interventions over the past few years. Currently, doctoral provision is concentrated at UCAD. There is a fairly even distribution of thematic areas, with doctoral schools often adopting a multi-disciplinary approach in order to pool resources. A recent development has been the introduction of doctoral provision in the private sector in partnership with public universities, resulting in diversified disciplinary availability such as Business Administration. Although doctoral training has undergone a series of regulatory enhancements, the quality of doctoral programmes was still viewed by interviewees and respondents as a crucial challenge, in particular in terms of creating a more networked and industry-relevant research training experience, and sufficient and frequent supervision.

The study noted that at the national level there is no well-articulated policy agenda guiding research and doctoral training in Senegal, and as such it was difficult to assess the alignment of institutional research priorities with those of the national-level research and development agenda. However, it can be surmised that much priority for research is in the fields of health,

food security, agriculture, climate change, energy, and information and communication technology. At the institutional level, the research priorities were clear as could be discerned from the research policies and doctoral programmes of the four main public universities. Nevertheless, the country still lacks a national research policy with clear vision, strategies, and an ambitious and sustainable funding mechanism.

The study further noted that the knowledge production system was poorly linked to the needs of other key stakeholders such as industry, the private sector and the needs of society. Partnerships between the Senegalese higher education sector and the industry/private sector were almost non-existent except in a few isolated cases, notably at UCAD. Additionally, the Faculty of Sciences and Technics at UCAD has created viable partnerships with AfricaRice, the Senegalese Institute of Agricultural Research and the Institute Pasteur of Dakar, which have research components and internship opportunities for students from the university. Nonetheless, Senegalese universities continue to be cartooned as 'ivory towers', barely open to communities and the external environment. Private companies, industries or employers' organisations show limited interest in universities and are weakly involved, although a new

regulation mandating industry and professional representation in university governance at public universities may help to address this.

Funding is a major constraint. Funding for research hardly meets the New Partnership for Africa's Development goal requiring the allocation of at least one per cent of GDP to research. Facing this crucial issue, we have seen that some programmes are addressing their funding challenges through novel and innovative approaches. The establishment of the FNRI represents a first step towards helping institutions tackle the problem of funding.

While internationalisation and university partnerships could play an important role in strengthening and providing more opportunities for research and doctoral training, it had not been fully utilised despite Senegal's advantageous position as one of the leading Francophone countries. The study reports on networks established by West African universities and those by French-speaking universities in which Senegal is playing a lead role. They have been used to strengthen its capacities for research and doctoral programmes in Senegal and in the participating countries. Future programmes that aim to enhance PhD capacity should take account of these existing networks.

# 9. Recommendations

The following recommendations are made for some possible interventions that could be adopted to take up the challenges that research and doctoral training are facing in Senegal.

- One of the main findings of this study is that the country urgently needs to establish new doctoral programmes and graduate schools in addition to strengthening the capacities of the existing ones. This is to address the inadequacy of opportunities for doctoral training and capacity deficits within the existing doctoral training programmes.
- The capacity of graduate schools as key players in doctoral training should be strengthened to ensure the more high-quality provision of doctoral studies. This should be done within the legal framework of the LMD reform, which has brought about major changes that are reshaping the training and research programmes in both public and private universities. The promotion of STEM subjects and pro-development research appears to be one change that institutions will need to respond to. At a very specific level, there is a need to strengthen and improve the supervision of doctoral students in order to increase efficiency in graduation rates.
- Universities should develop training programmes and research that address and provides solutions to pertinent issues in industry and the private sector. Universities should review in depth their research and training programmes to make them more interesting and attractive for companies. Additionally, one of the main challenges to take up in the short run is to bring those programmes in line with the priority development needs of the country.
- The country needs to establish a coherent, ambitious and well-articulated research agenda centred on social demands and social issues and in tune with contemporary scientific needs. This agenda should be supported through well-resourced programmes and be based on an allocation system that stimulates research and values its results. To this end, public and private companies, industry and employers' organisations can be tapped through partnership schemes with universities and research institutions.
- Given the non-existence of a clear national agenda for research and PhD training, higher education and research institutions should work hand in hand with state organisations (General Directorates for Research and Higher Education) and private sector organisations to bring their programmes in line with the main requirements of the national agenda. The remit of the ministry has expanded to now explicitly include innovation (the Ministry of Higher Education, Research and Innovation), but so far intentions to forge a national agenda have not been translated into specific actions.
- Increasing enrolment in PhD programmes requires more qualified teachers and efforts should be focused on building the capacity of teachers and researchers to obtain qualifications to get involved in PhD training.
- It is also important to develop support mechanisms to integrate young researchers into the academia or other areas where their expertise is needed. Mentorship programmes by senior scholars and post-doctoral programmes for newly graduated PhD students would therefore be crucial. In Senegal, there are rarely any opportunities for post-doctoral trainings.

# References

- Doucouré, B (2014) L'insertion professionnelle des jeunes docteurs au Sénégal. *Hommes et migrations* 1307: 87–92. Available online at: <http://journals.openedition.org/hommesmigrations/2884>
- Hathie, I (2009) *État des lieux de la Gouvernance de la Recherche Universitaire en Afrique de l'Ouest et du Centre: Rapport de Synthèse*. IDRC-CRDI. Available online at: <https://www.aau.org/wp-content/uploads/sites/9/2018/04/Etat-des-lieux-de-la-Gouvernance-de-la-Recherche-Universitaire.pdf>
- International Association of Universities (2010) *Internationalisation of higher education: Global trends, regional perspectives*. Paris: International Association of Universities.
- International Monetary Fund (2013) *Senegal: Poverty Reduction Strategy Paper*. Available online at: <https://www.imf.org/en/Publications/CR/Issues/2016/12/31/Senegal-Poverty-Reduction-Strategy-Paper-40739>
- Ministry of Higher Education and Research (2013) *Plan de développement de l'enseignement supérieur et de la recherche au Sénégal 2013–2017*. Available online at: [http://ifgu.auf.org/media/document/Plan\\_de\\_developpement\\_de\\_l'enseignement\\_superieur\\_et\\_de\\_la\\_recherche\\_PDESER.pdf](http://ifgu.auf.org/media/document/Plan_de_developpement_de_l'enseignement_superieur_et_de_la_recherche_PDESER.pdf)
- Ndiaye, N (2011) *Les technologies de l'information et de la Communication et l'Enseignement à Distance dans un environnement de massification des effectifs d'étudiants: le cas de l'UCAD*. Doctoral thesis. University of Bordeaux.
- Sagna, O (2013) *L'enseignement supérieur sénégalais à l'heure de la réforme. Direction générale de l'enseignement supérieur, ministère de l'enseignement, Programme des réformes prioritaires, PDSE 2013–2017*.
- Sy, M (2009) Rapport sur la gouvernance de la recherche à l'université Cheikh Anta Diop de Dakar, IDRC-CRDI. UNESCO Institute of Statistics (n.d.) Senegal: Science, Technology and Innovation. Available online at: <http://uis.unesco.org/en/country/sn?theme=science-technology-and-innovation>
- World Bank and Elsevier (2014) *A Decade of Development in Sub-Saharan African Science, Technology, Engineering & Mathematics Research*. Working Paper No. 91016. Available online at: <http://documents.worldbank.org/curated/en/237371468204551128/pdf/910160WP0P126900disclose09026020140.pdf>







# RESEARCH AND PhD CAPACITIES IN SUB-SAHARAN AFRICA: SOUTH AFRICA REPORT

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**Higher Education**

[www.britishcouncil.org/education/ihe](http://www.britishcouncil.org/education/ihe)

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**This report contributes to the theme of alignment between institutional research priorities and the national research agenda, as well as institutional engagement with societal needs, industry and the private sector.**

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# Foreword

This report forms part of a broader study commissioned by the British Council and the German Academic Exchange Service (DAAD) that surveyed research and doctoral training capacity in Sub-Saharan Africa. The study includes six country reports, namely Ethiopia, Kenya, Ghana, Nigeria, Senegal and South Africa. This report addresses the outcomes of the study in relation to South Africa. The country reports include expanded contextualisation of the national research training landscape,<sup>1</sup> while a synthesis report is also available highlighting the key policy implications for PhD provision specifically.<sup>2</sup> The aims of the study were to investigate: (i) the availability, quality and thematic priorities of PhD

programmes and how they have changed over the last ten years; (ii) the national level research agenda; (iii) the extent to which research training at the institutional level is aligned with the national agenda; (iv) national-level systems (policies, legislation) that facilitate alignment between institutional level research training and the national agenda; (v) how institutional priorities reflect the needs of universities and emerging research and development systems, including local industry; (vi) funding sources to develop and sustain PhD provision; and (vii) the role of international collaboration in building PhD capacity.

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1. Country reports can be found on the British Council website <https://www.britishcouncil.org/education/ihe/knowledge-centre/developing-talent-employability/phd-capacities-sub-saharan-africa> and DAAD website <https://www.daad.de/en/>

2. Synthesis report can be accessed on the British Council website at <https://www.britishcouncil.org/education/ihe/knowledge-centre/developing-talent-employability/phd-capacities-sub-saharan-africa>; and DAAD website <https://www.daad.de/download/phd201806>

# 1. The context of the higher education system in South Africa

## 1.1 Historical development

Since the dawn of democracy in 1994, South Africa's higher education has undergone a series of reforms. Among these are the various policies that were produced to increase access to higher education, redress past apartheid inequalities and to achieve economic growth (Department of Education [DoE], 1997; 2001). In 2002, policy was passed that reduced the number of universities in South Africa from 36 to 23 through mergers. This process led to the creation of three institutional types, namely: traditional universities with a research mission; comprehensive universities with a research and vocational education mission; and universities of technology which offer mainly vocational degrees, diplomas and certificates. Though all these institutions may offer PhD programmes, all qualifications offered must be approved by the Department of Higher Education and Training (DHET). They also need to be registered with the South African Qualifications Authority (SAQA) and accredited by the Council on Higher Education (CHE). Due to the growing pressure for more access to higher education, the government has established three new universities since 2014, bringing the number of public universities to 26.

Student enrolments increased from 735,000 in 2005 to 983,698 in 2013, an increase of 34 per cent. By 2012 South Africa had a gross tertiary enrolment rate (GTER) of about 20 per cent calculated based on the total population between the ages of 20 and 24 years. This is one of the highest participation rates in Africa. In *The White Paper for Post School Education*, the government set a new target for GTER at 25 per cent by 2030 (DHET, 2013: 30). However, the increased numbers of students admitted to universities in the last decade has led

to some negative impacts especially on academic quality. It has also resulted in decreasing throughput and low graduation rates. This is also attributed to the poor preparation of students for tertiary education arising from the low quality of primary and secondary schools (Taylor and Shindler, 2016). Significant changes have taken place in the demographic profile of university students. Statistical data in South Africa still follows the apartheid racial classification in order to track transformation. In 2014, the student population comprised 72 per cent African, 15 per cent white, six per cent coloured, and five per cent Indian compared to 62 per cent African, 25 per cent white, six per cent coloured and seven per cent Indian in 2003.<sup>3</sup> The participation of female students has also grown from 43 per cent of enrolments in 2003 to 58 per cent in 2013.

South Africa subscribes to a funding framework in which costs are shared between the government and direct beneficiaries of university education. The government uses a block grant system which is supplemented by fees from the students. A report by Universities South Africa (USAF, 2016) indicates that universities are underfunded and that government subsidies to universities have declined in real terms by over 30 per cent in the last two decades. This decline has put pressure on the other two sources of income available to universities, namely, tuition fee income, which is currently contested by the 'fees must fall' movement in South Africa, and third-stream income (typically research grants, contract income and donations). The no-fee increase granted to students in 2015 and the student protests that characterised most of 2016 have exacerbated the situation. The government also provides direct funding to poor students through

a funding programme managed by the National Student Financial Aid Scheme (NSFAS).

## 1.2 Current research and doctoral training landscape

In 2002, the newly established Department of Science and Technology (DST), which was mandated to manage a coherent national system of innovation (NSI) and to enhance South Africa's research capacity, adopted the National Research and Development Strategy (NRDS). The aim was to raise the national investment in research and development (R&D) to two per cent of GDP by 2018 and double South Africa's share of global research outputs from 0.5 per cent in 2002 to one per cent by 2018 (DST, 2002).

In line with these targets, the National Research Foundation (NRF), as the key government agency that funds research in the country, was charged with the responsibility of increasing the production of high-quality PhDs to serve the knowledge society (NRF, 2007). However, a report commissioned by the DST and the NRF (ASSAf, 2010) indicates that in 2007 South Africa produced only 1,274 doctoral graduates. In that year, there were a total of 26 PhDs per million of the population, which compared unfavourably with some other middle-income countries. From 2010 to 2016, new strategic plans and policies were developed outlining plans and priorities for PhD and research production. In particular, the *National Development Plan: Vision for 2030* (NPC, 2011), adopted by the South African government as its macroeconomic growth plan set the national target at 100 doctoral graduates per one million of the population by 2030, which translates to 5,000 graduates per annum, a fivefold increase on the 2007 figure.

3. We use the terms 'African', 'coloured', 'Indian' and 'white' as designators of race. We use the term 'black' as an umbrella term to include 'African', 'coloured' and 'Indian'.

## 2. Methodology

This report is based on a comprehensive document analysis and interviews conducted with selected key stakeholders in a sample that included representatives of universities, government departments and industry. It should be noted that, in contrast to many other countries in Africa, two key studies on doctoral education in South Africa have been published in the last decade. One of these was based on a number of studies conducted by one of the researchers and the author of this report (ASSAf, 2010), and another which was completed more recently (Cloete et al., 2015). These studies followed rigorous methodological approaches which included large national surveys, as well as interviews with key stakeholders in doctoral education in South Africa. As such, we took an approach that could enable us to complement these prior studies with some new insights. In particular, this report contributes to the theme of alignment between institutional research priorities and the national research agenda, as well as institutional engagement with societal needs, industry and the private sector.

Given the availability of prior research on doctoral education in South Africa, this report is accordingly mainly based on analysis of previous studies and reports on doctoral education in South Africa from the early 2000s to 2016.

The document analysis included policy documents and research reports from national actors such as the Department of Higher Education (DHET), the Council on Higher Education (CHE), Universities South Africa – which replaced Higher Education South Africa (HESA) the National Research Foundation (NRF), the Department of Science and Technology (DST) and the National Planning Commission (NPC). Statistical information was accessed from the Higher Education Management Information System (HEMIS).

In line with the aims of the broader, six-country study to identify institutional experiences in doctoral provision in some depth, data was also collected from a sample of six higher education institutions from three provinces. In order to ensure diversity, the sample criteria included: historical profile (advantaged or disadvantaged); type (comprehensive universities, traditional universities and universities of technology); and modes of delivery (contact and distance). All the institutions award degrees including doctorates, though some are research-intensive institutions and had better research and PhD production capacities. Others could be defined as emergent research-intensive institutions (some previously disadvantaged universities), where there is growing capacity, while some had low capacity to produce and supervise PhDs as is the case with

most universities of technology in South Africa. Table 1 summarises the profiles of the sampled institutions including their PhD provision for 2014.

Data was collected at these institutions via document analysis and interviews. Documents comprised institutional policies and strategies relating to research, and research reports. Interviews were conducted with a purposive sample of senior members of staff comprising those in charge of research (such as the Deputy Vice Chancellor for Research) and used to augment the document analysis and statistical data. Due to the unavailability of some individuals and time constraints of the research project, the resulting interview sample comprised three members of staff, one each at three out of the six institutions. In order to provide cross-sector context to the institutional data, one further interview was also carried out with a representative from industry. In particular, this provided insights into companies' motivations and strategies for becoming involved with masters and doctoral research training.

**Table 1:** Profiles of the sampled institutions

Institution	Status/type	Location	Size (no. of campuses)	General student population 2014	No. of PhD students enrolled in 2014	No. of PhD students graduated 2014	Number of PhD programmes
Tshwane University of Technology (TUT)	University of technology	Campuses in four provinces	8	56,785	321	46	69
University of KwaZulu-Natal (UKZN)	Merged/traditional	Durban, KwaZulu-Natal	5	45,465	2,453	264	90
University of Limpopo (UL)	Traditional (historically disadvantaged)	Polokwane, Limpopo	2	23,384	249	25	42
University of Pretoria (UP)	Traditional (historically advantaged)	Pretoria, Gauteng	7	56,376	2,155	237	211
University of South Africa (UNISA)	Comprehensive (distance education)	Pretoria, Gauteng	3	328,491	2,100	268	48
University of the Western Cape (UWC)	Traditional (historically disadvantaged)	Cape Town (Bellville), Western Cape	1	20,582	714	104	109

Source: HEMIS (2014) and institutions' websites

# 3. Availability, thematic priorities and quality of PhD provision 2005–14

## 3.1 Expansion of PhD production in South Africa

By 2014, South Africa had increased its total number of PhD holders to 34 per million of its population. However, this figure is still low in comparison with other developing countries, such as Brazil (70) (UNESCO, 2015). It is also inadequate to enable South Africa to respond to its development needs. The National Development Plan (NDP) (NPC, 2011: 278) has set a target to produce more than 100 doctoral graduates per million by the year 2030. In 2014, doctoral graduates comprised just 1.2 per cent of overall university graduations and 5.9 per cent of total postgraduates. Doctoral enrolment comprises 1.9 per cent of the overall students' enrolment in the universities and 14 per cent of total postgraduates. The NDP suggests that by 2030, over 25 per cent of student enrolments in the universities should be at a postgraduate level (NPC, 2011: 319).

Table 2 shows the increase in the number of PhD graduates from public higher education institutions in South Africa between 2005 and 2014. The main trends and major shifts are summarised as follows:

- The number of PhD graduates per annum almost doubled over the past ten years suggesting that South African universities responded to the national call to expand the production of PhDs. It further suggests that the NDP's target of 5,000 new PhD graduates per year by 2030 could be reached if this trend is maintained.
- PhD and knowledge production capacity is not evenly distributed in South African universities. Stronger capacities exist mainly in the historically advantaged universities of which nine produced 79 per cent of all PhD graduates in 2014. The differences in PhD production and research capacities has led to debate on the need for differentiation of the institutions (Cloete, et al 2015) on research and teaching universities. South Africa has been reluctant to make that distinction given that the top PhD-awarding universities are former white universities.

- Over the past ten years, selected universities of technology and previously disadvantaged universities have shown a significant increase in the number of doctoral graduates, albeit from a very low base. The same applies to newly-merged institutions such as the University of KwaZulu-Natal (UKZN), which almost tripled its PhD production, North-West University (NWU) and Nelson Mandela University (known as Nelson Mandela Metropolitan University until July 2017). Table 2 presents the shifts in PhD graduate numbers in South African universities between 2005 and 2014.

**Table 2:** PhD graduates from public higher education institutions in South Africa, 2005 and 2014

Institution name	Institutional characteristics	2005	2014	% increase
<b>Traditional</b>				
University of KwaZulu-Natal*	Merged	96	264	175
University of Pretoria*	Previously advantaged university	192	237	23
University of Stellenbosch	Previously advantaged university	126	234	86
University of Cape Town	Previously advantaged university	182	204	12
University of Witwatersrand	Previously advantaged university	101	199	97
North West University	Merged	82	171	109
University of Western Cape*	Previously advantaged university	35	104	197
University of the Free State	Previously advantaged university	65	104	60
Rhodes University	Previously advantaged university	31	76	145
University of Fort Hare	Previously disadvantaged university	1	66	6,500
University of Limpopo*	Merged	15	25	67
<b>Comprehensive</b>				
University of South Africa*	Distance	92	268	191
University of Johannesburg	Merged	88	106	20
Nelson Mandela Metropolitan University	Merged	30	72	140
University of Zululand	Previously disadvantaged university	18	25	39
Walter Sisulu University	Previously disadvantaged university	1	8	700
University of Venda	Previously disadvantaged university	3	1	–
<b>Universities of technology</b>				
Tshwane University of Technology*		12	46	283
Durban University of Technology		4	18	350
Cape Peninsula University of Technology		6	17	183
Central University of Technology, Free State		6	12	100
Vaal University of Technology		2	1	–
<b>Grand total</b>		<b>1,188</b>	<b>2,258</b>	<b>90</b>

Source: Higher Education Management Information System (HEMIS 2014)

\*The asterisk indicates the institutions sampled for this study.

### 3.2 Demographic changes

A major policy imperative in doctoral training and building research capacity, which might be unique to South Africa, is the transformation agenda for the higher education system. This is mainly focused on redressing the skewed racial and gender imbalances of the apartheid era. Two decades after the transition to democracy, doctoral training changed from being exclusively dominated by white males to being more diverse and inclusive. In 1990, 93 per cent of PhD graduates were white, while by 2015 whites comprised only 37 per cent of PhD graduates. It is, however, important to note that the increase in the number of African students is linked to the increase in the number of international students especially from the South Africa Development Community (SADC) countries and others from the rest of Africa. In 2014, 40 per cent of the doctoral students in South African universities were international students (HEMIS 2014).

### 3.3 Changing thematic priorities

South Africa has a number of policies that provide guidelines on the priority areas for research. These include the South African Research and Development Strategy which identifies a number of scientific areas in which South Africa

has a regional knowledge advantage (DST, 2002). There are also the five 'grand challenges' of the DST Ten-year Innovation Plan (DST, 2008) and the National Development Plan (NPC, 2011). The documents emphasise poverty reduction, which encompasses water and sanitation, food security and agriculture, education, climate change, marine, space sciences, health and energy, as well as HIV/AIDS research. In recent years there has also been emphasis on community engagement and social responsiveness aimed at poverty reduction (CHE, 2010) and meeting the Sustainable Development Goals (SDGs).

Science and technology are considered crucial for the achievement of these thematic priorities. The government's aspiration is that by 2030 most of the PhDs should be focused on science, engineering, technology and mathematics (NPC, 2011). An analysis of the graduation rates by Classification of Educational Subject Matter (CESM) indicates that Life Sciences and Physical Sciences is the area with by far the highest numbers of doctoral graduates in South Africa, and one of the disciplines recording fast growth between 2005 and 2014. In line with the national priority, PhD production in this area increased from 18 per cent of all PhDs in 2005 to 22 per cent in 2014. Over the same period there was significant growth in the

number of PhD graduates in business, economic and management studies, law, education, computer and information studies. This indicates a shift towards applied subjects aimed at the labour market, employability and entrepreneurship. There was however a decrease in the proportion of PhD graduates in health sciences which is a concern considering the health challenges experienced in the country. Engineering, which is considered to be the vehicle for economic and technological transformation (NPC, 2011) showed steady growth in the numbers of PhD graduates, in line with the overall expansion. Table 3 shows the increases in PhD production in the different subject areas.

A number of institutional discrepancies were identified. There was a greater emphasis on the natural and physical sciences at historically advantaged universities, such as University of Pretoria and University of KwaZulu-Natal. On the other hand, UNISA, as a distance education institution, produced about 50 per cent of its PhDs in education, theology, health and psychology. It was also notable that PhD production capacity was increasing in some of the historically black universities such as University of Western Cape where the number of PhDs in the sciences rose from 12 in 2005 to 39 in 2014.

**Table 3:** Number of PhD graduates by CESM, 2005 and 2014

CESM	2005	% of total 2005	2014	% of total 2014	Increase in graduates (%)
13: Life sciences and physical sciences	211	18	505	22	139
09: Health professions and related clinical sciences	175	15	244	11	39
07: Education	114	10	229	10	100
04: Business, economics and management studies	65	5	193	9	197
20: Social sciences	91	8	166	7	82
08: Engineering	79	7	154	7	95
17: Philosophy, religion and theology	108	9	133	6	23
11: Languages, linguistics and literature	70	6	111	5	58
18: Psychology	68	6	105	5	55
01: Agriculture, agricultural operation related sciences	51	4	79	3	55
19: Public management and services	48	4	71	3	48
12: Law	24	2	70	3	192
15: Mathematics and statistics	28	2	67	3	139
06: Computer and information sciences	9	1	55	2	511
03: Visual and performing arts	18	2	32	1	79
02: Architecture and the built environment	4	0	22	1	438
05: Communication, journalism and related studies	6	1	19	1	217
<b>Total</b>	<b>1,189</b>		<b>2,258</b>		<b>90</b>

Source: Higher Education Management Information System (HEMIS 2014)

### 3.4 Quality assurance provisions and practices in PhD training

The higher education landscape in South Africa is not differentiated in terms of PhD programme offerings. Any approved higher education institution can thus offer PhDs in different fields. However, there are stringent national and institutional policies to ensure the quality of the PhD. The DHET determines the programme and qualification mix (PQM) at any institution as a quality control mechanism. It thus places limits on the range of doctoral programmes that institutions can offer. Nevertheless, merely being on the list of PQM cannot be taken as an indication of a subject's quality.

The CHE, through its Higher Education Quality Committee (HEQC), is responsible for quality assurance and quality promotion in higher education. Only programmes that are approved by the DHET, registered with the South African Qualification Authority (SAQA) and accredited by the CHE are funded by the DHET. According to the HEQC accreditation model, responsibility for doctoral programme quality rests on the institutions themselves. Universities are required to ensure that they conform to the standards stipulated by the Higher Education Qualification Sub-Framework (HEQSF) (CHE, 2013). This framework document stipulates the provisions for offering doctoral degrees.

At most universities, students are carefully selected, and need to prepare and defend a proposal before embarking on their doctoral research. Each institution and faculty has its own particular procedures for approving

the research focus of a thesis. Usually research may not be undertaken without prior written approval of an ethics committee or other authorised committee. In most institutions, the doctoral thesis is assessed by peers who should include at least one international examiner. At the University of Pretoria for example, the thesis is usually assessed by three examiners of whom at least two are external, with one preferably being an international scholar. Supervisors cannot be the examiners of the same thesis whose production they have supervised. Doctoral candidates are usually called upon for an oral defence (*viva voce*) of their theses. Usually the same examiners are appointed to assess the thesis and adjudicate its oral defence. The University of Pretoria also requires students to submit an article based on their doctoral research for publication in an accredited journal. To offset the rising trend of publishing in poor-quality journals catering for the 'publish or perish' syndrome, most South African universities (such as University of Pretoria), encourage their academic staff and PhD graduates to publish in accredited journals with a high impact factor. This is another strategy that enhances the scientific research outputs of the country.

However, there are a number of challenges concerning the quality of PhD training and research in South African universities. These include: poor preparation by students for doctoral studies; unrealistic expectations of doctoral students; the absence of mandatory course work in some programmes; a funding formula that encourages institutions to increase

PhD production; inadequate incentives for supervisors, the heavy burden of the supervision, and lack of supervisors in certain disciplines (Cloete et al., 2015; Teferra, 2015; Waghid, 2015; Thaver and Holtman, 2015). One of the main motivations for pursuing a PhD is the fact that it provides better possibilities of employment. Cloete et al. (2015) reported the results of three tracer studies which indicated that the vast majority of doctoral graduates who were not in employment during their studies managed to find employment quite quickly after graduation. However, completion rate of PhD studies was about 45 per cent for the 2007 cohort after six years, with vast discrepancies between institutions and disciplines. For example, UWC had a 60 per cent completion rate, while UNISA had a 25 per cent completion rate (Cloete et al., 2015).

Time to completion is also considered a measure of quality in PhD training. According to Cloete et al. (2015), the average time for completion of a PhD in South Africa is close to five years which compares favourably with international benchmarks. Currently, there is pressure on universities, which is linked to funding, to ensure a three-year completion time for PhDs. This may have a negative effect on the quality of the degree. Brenda Wingfield (2011) from the Faculty of Natural and Agricultural Sciences (NAS) at the University of Pretoria argues that this pressure increases dropout and has an impact on quality since even 'a strong student could require additional time to complete a valuable piece of research'.

## 4. National research agenda

The national research agenda of South Africa is anchored on three main strategies, namely: (i) transforming academia to retain more black academics; (ii) developing capacity and expanding PhD training and (iii) developing a viable pipeline for postgraduate studies. Internationalisation is also a major national agenda as will be discussed in section 9 of this report.

### 4.1 Transforming academia

The transformation agenda has become a national priority manifested in a number of policy documents produced by the Departments of Labour, Higher Education, and Science and Technology. Universities, especially previously white institutions, are actively pursuing a transformation agenda to address issues of privilege, exclusion, racism and prejudice.<sup>4</sup> While there is a definite increase in the number of black and female doctoral graduates, data indicates a very slow change in the number of black South Africans obtaining PhDs (35 per cent growth over the ten-year period from 2005 to 2014). There is also slow transformation in terms of the demographic profile of the professoriate in many previously advantaged universities. It is evident that meeting the equity targets depends on the recruitment of international students from the rest of Africa. Black South African students struggle to secure sufficient funds to support their studies and are in many cases attracted to lucrative positions that do not require PhDs. This raises doubts whether transformation in terms of equity and diversity can be achieved in the short term.

While the equity target of the NRF's scholarship programme is 80 per cent black and 60 per cent female, there are not enough black South African candidates to take up these opportunities. In 2014–15, 59 per cent of the funds went to female doctoral students and 61 per cent were awarded to black students (NRF, 2015: 63). This finding was corroborated by one interviewee who argued that he had funds available for sponsoring students but he could not find full-time black South African students to sponsor. Given that the scholarships are designated for black and female students, they cannot be transferred to other student categories without the approval of the NRF. This allocation of the scholarships is strictly adhered to in order to put pressure on institutions to put more effort into enrolling more black students. It is also hoped that beneficiaries of these scholarships would complete their studies and add to the much-needed pool of qualified black professionals and holders of higher degrees. Furthermore, while redress policies at national and institutional levels have improved access for blacks and women, black academics tend to find themselves marginalised by many institutional environments and cultures, and by the hegemony in the centres of administrative and academic power (committees, disciplines, departments and faculties) of white academics and administrators (HRDC, 2015). Student demonstrations and movements such as 'Rhodes must fall'<sup>5</sup> and 'fees must fall' have placed additional demands on universities to transform not only quantitatively but also qualitatively by looking at curricular and cultural transformations. This includes the change in language policies at previously Afrikaans-speaking universities.

### 4.2 Building supervisory capacity

In order to produce more doctoral students to achieve the national target, more PhD supervisors are needed. In 2014, only 43 per cent of academics in South African universities had a PhD. This does, however, represent a substantial increase since 2005, when only 30 per cent had doctoral degrees. It further indicates the responsiveness of the universities to this national priority. Nevertheless, about one-fifth of academics in South African universities are due to retire in less than a decade, including nearly half of the professoriate. This presents a serious challenge to the PhD capacities of South African universities. In response, the NDP (NPC, 2011) has set a target requiring that 75 per cent of permanent academic staff should have a doctoral degree by 2030.

There are vast discrepancies between institutions, especially related to institutional histories (see Table 4). There are four main factors which inform the state and capacity of institutions to deliver PhDs: whether the institution was advantaged or disadvantaged under apartheid, which was closely related to the racial group for which it was established; whether the institution was merged or not post 2004; if so, with what type of institution it was merged; and whether it was originally established as a traditional university or a technikon (Breier and Herman, 2017). For instance while at the University of Pretoria (UP) only 33 per cent of academics do not have PhDs, this figure rises to 84 per cent at the University of Limpopo (UL). Such differences can be best explained by these historical contexts. Table 4 presents the PhD staff capacities in the sampled universities between 2005 and 2014.

4. Proposed transformation priorities for the revised University of Pretoria, 2025.

5. 'Rhodes must fall' is a protest movement that began on 9 March 2015, directed against institutional racism at the University of Cape Town (UCT), where there was a statue commemorating Cecil Rhodes. Similar protests erupted across South Africa.

While developing the next generation of academics, which must be increasingly constituted by black South Africans and women, has become a national priority, academia is not a particularly attractive career option compared with other professions (HRDC, 2015). This is due to, among other factors, the relatively low salaries, expanding student numbers and consequent workloads and institutional culture issues (HESA, 2011).

### 4.3 Developing the pipeline

Government policy aims to improve undergraduate throughput rates in order to ensure a viable pipeline for postgraduate studies (DHET, 2013). The ASSAf (2010) Report identified a number of constraints associated with the pipeline of doctoral students, such as the high drop-out rates (about 50 per cent) among first-year students and subsequent low graduation rates, especially among black students. This relates to the poor level of

matriculants produced by the school system. Furthermore, the honours degree (the optional fourth year of an undergraduate degree) can often become a bottleneck which leads to low enrolment at master's level. A number of initiatives, such as the NRF's Human Capacity Development Excellence Pipeline, and the DST/NRF Professional Development Programme (PDP) (NRF, 2016b), support students throughout their university years to develop the pipeline for postgraduate studies.

**Table 4:** Permanent academic staff without PhDs in the sampled universities, 2005 and 2014

Institution	2005			2014		
	Staff without doctorates	Total instruction/research staff	% staff without doctorates	Staff without doctorates	Total instruction/research staff	% staff without doctorates
University of Pretoria (UP)	898	1,575	57	452	1,176	38
University of Western Cape (UWC)	266	465	57	283	615	46
University of KwaZulu-Natal (UKZN)	969	1,448	67	678	1,348	50
University of South Africa (UNISA)	827	1,308	63	1,028	1,718	60
Tshwane University of Technology (TUT)	779	880	89	734	951	77
University of Limpopo (UL)	686	804	85	787	941	84

Source: Higher Education Management Information System (HEMIS, 2014)

# 5. Linking institutional research priorities, PhD programmes and the national agenda

Most universities in South Africa align their strategic plans and visions to the major national policy documents such as the NDP, the *White Paper for Post-School Education and Training in South Africa* and the DHET's (2014b) enrolment planning. At the same time, through the various funding mechanisms, the government influences and steers the institutions towards these national goals. However, there is recognition that this alignment depends on the availability of expertise and capacity, as well as recognition of the autonomy of individual researchers who pursue their own agenda, choose their own collaborators, and determine how they wish to contribute to knowledge production. The data indicates that increasing research capacity in niche areas is one of the top priorities for most universities. Transformation, achieving equity targets and internationalisation also define the vision and practices in some institutions. These goals are discussed below.

## 5.1 Increasing research capacity

Following the national target, a significant component of universities' strategic plans is the priority of increasing postgraduate student numbers and enhancing supervisory capacity. Most universities have enabling policies, a dedicated research office and an institutional research plan or strategy which facilitate and strengthen research capacity building and postgraduate studies. Some universities may also have a school or centre for postgraduate studies for the same purposes. UNISA, for example, has established the College of Graduate Studies which is responsible for the facilitation of research training for postgraduate students.

In recent years nearly all South African universities encourage, and even pressurise, academic staff to obtain a PhD degree. Those who do not have a PhD are often expected to complete their PhDs within agreed timeframes. A PhD is in many cases part of academics' performance assessment/agreement and also a condition of employment for new academic staff. In line with this, ample support in the form of funds, which are mostly accessed from the NRF, time off, teaching replacements and skills enhancement is available for the PhD candidates.

Increasing PhD production is a challenge for previously disadvantaged universities and for universities of technology which are mainly undergraduate institutions with very low research and supervisory capacities. Historically, *technikons* (colleges of advanced technical education) were not allowed to offer degrees until the late 1990s. As such, when their status changed to that of a university after the mergers in 2004, the majority of staff did not have PhDs and thus could not supervise PhD students. Subsequently, their main challenge was to upgrade staff qualifications to doctoral level and to recruit staff with doctoral degrees. At TUT, for example, staff were given seven years to complete their PhDs. This was supported by NRF funds which enabled academics to find replacement lecturers or take a sabbatical.

The same challenge applies to previously disadvantaged universities such as the University of Limpopo (UL). As a predominantly teaching-focused university, UL is significantly lagging behind the national standard in terms of doctoral students' enrolments, PhD graduation rates and research output.

In 2014, UL produced only 25 PhDs, one per cent of the national production. This relates to lack of capacity as only 16 per cent of their academic staff possess a PhD. Furthermore, the burden of teaching the large undergraduate classes limits the time available for research. Subsequently, the university cannot accommodate many applications for postgraduate studies. The completion time is also not in line with DHET's expectations. The university chose the route of 'growing your own timber' and focuses on strengthening undergraduate study significantly in order to provide the pipeline for postgraduate studies at the institution.

Singh (2015) points out the various challenges related to building research capacity at a previously disadvantaged university such as UL. These include the 'poaching' of experienced researchers by other established higher education institutions, limited funding and English as a second language for the majority of students and academics. In order to counteract the low publication rate, UL increased the incentives for researchers who publish in accredited journals to 40 per cent of the funding received from the DHET. In 2011, this had a monetary value of R40,000 (which in 2011 was equal to over \$3,800) that the researchers could cash in or use as a research fund.<sup>6</sup> Furthermore, cash incentives are given to supervisors of completed research master's and doctoral studies and to rated researchers. UNISA follows a similar route which may partially explain the increased number of PhD graduates in the last decade. However, the impact of these incentives on the quality of the doctorate has not been explored and is an area for future research.

6. UL 2010 Incentives and Awards Programme and Procedure document.

## 5.2 Institutional research priorities

Research and innovation capacity are often enhanced through targeted niche areas. Universities strategically select niche areas that are relevant to national and regional needs, priorities and opportunities, depending on their capacity to work in these areas and their own institutional interests. This applies to universities with low research capacity, emergent research institutions and even to research-intensive institutions. Subsequently, research priorities at each institution are closely aligned to the national priorities as outlined in the Research and Development Strategy, the DST Ten-year Innovation Plan and the NDP. There is also an alignment with regional policies, such as the SADC agenda, the African Union (AU) agenda, and with the global agenda as expressed in the SDGs.

All these agendas basically aim to make research nationally and internationally relevant, focusing on social issues such as alleviating poverty, providing education and employment, as well as issues related to water, climate change, and food and energy security among others. As one of the interviewees explained:

*'We will meet those international goals but we need to look at first our locality, the teaching that we are doing, the research that we are doing, how does it contribute to our society, in turn it will be addressing the [international goals] because it will be linking issues relating to poverty ... and issues relating to provision of food, water, energy and all those things. So I don't think it's ideal to focus on them as if they are the ultimate, if you are dealing with issues at local level, I think that is how it will contribute to the international recognised development goals.'*

Furthermore, universities also address the research and development needs of the regions or provinces in which they are situated. For example, the Council for Scientific and Industrial Research (CSIR) has established a centre at the UL that looks at climate change to address water scarcity and lack of quality water in the province. Universities with low capacity for research and supervision have to be selective and choose the research areas in which they have some capacity, but also have to align these with national priorities in order to be funded through the South African Research Chairs Initiative (SARChI). However, there is a view that churning out the number of graduates to comply with the enrolment plans is the first priority for institutions with low or emergent capacities and less attention is given to national research priorities.

### 5.3 National and institutional funding for research

There is a national funding mechanism in place that incentivises universities to increase their research output in support of the national research agenda.

Government funding of research at universities takes place through 'block grants', which include the *research output grants* (New Funding Framework [NFF], DoE, 2004). These funds are allocated according to the number of research master's degrees, doctoral degrees and accredited research publications that an institution produces each year (weighted 1:3:1). The *research output grants* encourage institutions to improve their share of research outputs and also their doctoral graduation rates which carry the greatest weight. The measurement of research output is done centrally and is controlled by the DHET (DoE, 2003). This subsidy framework for postgraduate research has a significant impact on the production of PhDs. Some universities like UL and UNISA directly give incentives to supervisors (as highlighted above) to encourage their productivity.

Institutions themselves adopt several funding or incentive strategies to enhance their academics' research capacity, including upgrading their qualifications to PhD level. South African universities tend to offer bursaries or scholarships from their

own institutional funds (first- and second-stream income) for doctoral studies on the basis of merit or on the basis of student need, with the value of these bursaries varying substantially between institutions. These bursaries are usually awarded for a period of three years (SARUA, 2012). Universities also fund PhD research indirectly by fee waivers and offering accommodation, as well as by providing temporary employment for candidates as junior lecturers or laboratory assistants.

UNISA is a good example of the range of funding opportunities provided for academics to enhance their research capacity. These include paying for replacements to allow academics to attend various workshops and fellowships. It allows academics to spend several months visiting an institution identified as having research relevant to UNISA's aims. There is also support for academic staff who pursue their postgraduate studies at other institutions in addition to financial incentives for completing a PhD. Similarly, the University of Pretoria has the Research Development Programme (RDP) which supports academics without a PhD to take time off to complete their studies and the university pays for their teaching replacement. Further in-house development programmes such as writing for publication workshops are also provided to build research capacity.

Bursaries and scholarships for doctoral education are also awarded by South African universities from earmarked third-stream funds. These funds usually originate from donations, investments and entrepreneurial activities of the universities. It is usually the historically advantaged universities that have the finances to offer these types of bursaries. The size and conditions of these bursaries vary considerably. Most funding received from corporates or state-owned companies is meant for engineering, health, finance and education students (HRDC, 2013), thus channelling the funds to national priority areas. The main strategy that universities employ for attracting more funds is by responding to calls for grants. However, these calls can be restrictive or have co-funding expectations that some institutions are not able to meet. Universities with a strong research focus such as UKZN, UWC and UP are able to attract a higher percentage of private funds, while other institutions may have limited third-stream income.

Section 8 discusses further funding issues related specifically to the cost of participating in PhD programmes, as well as funding opportunities for 'new' entrants not already employed at the universities.

## 6. National-level systems that enable and facilitate institutions to work to the national agenda and meet the national goals

The main players in higher education in South Africa have developed various initiatives to enable institutions to meet the national agenda. The NRF's Thuthuka<sup>7</sup> Programme, initiated in 2001, aims to promote the attainment of PhD qualifications, as well as the development of the research capacity of early career academics employed at South African universities. In order to address past inequalities, 80 per cent of all funded grant holders on the PhD track have to be black; and up to 60 per cent female.<sup>8</sup> During the 2014–15 reporting period a total of 662 students benefited from this funding. Of the recipients, 59 per cent were female and 69 per cent were black, a shortfall of 11 per cent on its equity target (NRF, 2015).

The DST's 'Improve Academic Qualifications of Academic Staff and Researchers' initiative aims at accelerating the doctoral level training of full-time academic staff, including supervisory capacity at public universities and research institutions. It aims to transform the demographic composition of the emerging community of researchers with respect to gender, race and disability. Through this programme academic staff may take sabbatical leave of between six and 12 months in order to complete their doctorates. The programme is only open to South African citizens (NRF, 2014a). This programme was allocated R10 million (\$700,000) for the 2014–15 financial year.

The Department of Higher Education (DHET) has initiated the 'Staffing South Africa's Universities' (SSAUF) programme aimed at transforming the demographics of South African universities. The New Generation Academics Programme (nGAP) was implemented at the end of 2015, and universities submitted 500 applications for nGAP posts to be implemented during the 2015–16<sup>9</sup>

financial year. The nGAP programme recruits new academics who comply with the equity target and priority research areas. However, this has resulted in some institutions with low research capacity, such as UL, losing academics to research-intensive institutions. This has a negative impact on their teaching capacity at undergraduate level which is their core function. From an interview with DVC research at one of the sampled universities, another criticism levelled on the nGAP programme is that it is over optimistic. It questions the level of the requirements that are accepted and overlooks junior lecturers already in the system, who earn less than nGAP academics whose commitment to teaching might be unknown.

In order to address the national research agenda, the NRF introduced three initiatives that have significantly increased research capacity in the country. These are the Centres of Excellence (CoEs), SARCHI, and the National Facilities (NFs). The CoEs, initiated in 2004, focus on promoting collaborative and interdisciplinary research with the aim of enhancing research and knowledge production, as well as capacity development on a long-term basis (NRF, 2016a). SARCHI aims to attract and retain excellence in research and innovation at South African public universities through the establishment of research chairs at these institutions with a long-term investment trajectory of up to 15 years. Evidence shows that research chair holders supervise approximately twice as many PhD students and three times more postdocs than any other grant holders (NRF, 2011). This seems to be an effective way of addressing the need to develop research capacity and the next generation of academics.

The NFs provide a large equipment base and a unique set of critical skills to the broader research community. Between 2005 and 2010, the NFs supervised 938 postgraduate students, published 927 articles in peer-reviewed journals and engaged in 1,056 international collaborations (NRF, 2011). The NRF Annual Report for 2014–15 indicates that there are 150 active chairs, 15 CoEs and seven NFs. These initiatives have helped to increase the number of scientific research outputs of researchers and PhD graduates. Through these initiatives 245 master's and 228 doctoral students were supported between 2010–11 and 2014–15. Of the master's students, 62 per cent were black and 44 per cent female, while of the doctoral students 61 per cent were black and 52 per cent female (NRF, 2015). The NRF Strategic Plan 2015 to 2020 proposes the creation and support of more research chairs, CoEs and NFs. The investments as highlighted above demonstrate the seriousness with which the South African government takes the role of research development and the need to replenish the next generation of academics.

Other science councils such as the Medical Research Council (MRC) and the Agricultural Research Council (ARC) have instituted similar initiatives to support research capacity development in their respective areas. These initiatives and funded facilities seem to have had a positive impact on the qualifications of academics which, as has been indicated before, showed a national increase of 13 per cent between 2005 and 2014.

7. *Thuthuka* is a Zulu verb, meaning 'to develop'.

8. [www.nrf.ac.za/division/funding/thuthuka-2017](http://www.nrf.ac.za/division/funding/thuthuka-2017)

9. DST-NRF Research Development Grants for 'New Generation of Academics Programme (nGAP)Scholars', NRF March 2016.

## 7. Relationship between institutional priorities, research and development systems and the needs of local industry and society

South Africa is a middle-income country and is one of the most resource-rich economies in Sub-Saharan Africa. The leading industrial commodities are uranium, palladium, diamonds, coal and platinum. The South African economy is still very much a low-skill, mineral extraction, export-dominated model (Cloete et al., 2015). The DST's Ten-year Innovation Plan (TYIP) and the NDP (NPC, 2011) place significant emphasis on increasing levels of research and development. In 2013, South Africa's total (public and private sector) gross domestic expenditure on research and development (GERD) had declined from 0.89 per cent in 2008 to approximately 0.73 per cent (government 43.1 per cent of total percentage)<sup>10</sup> of GDP. This decline was due mainly to a drop in private sector funding that could not be offset by a concomitant rise in public spending on research and development. By comparison, the average OECD country expenditure is 2.15 per cent of GDP. Finland, for example, with an economy the same size as South Africa, spends 3.5 per cent (government one per cent) of its GDP on research. South Africa also lags behind most of its BRICS counterparts. China spent 1.84 per cent of GDP on research and development, Brazil 1.16 per cent, and Russia 1.09 per cent during the same period. India spent 0.76 per cent of GDP on research and development in 2008, the latest year for which figures are available. The Square Kilometre Array (SKA) initiative that was awarded to South Africa and its partners is expected to boost research and development in South Africa, particularly in astronomy, engineering, ICT and mathematics.

There are numerous collaborations between industry and universities, especially research-intensive institutions. The firms that co-operate with universities spend significant amounts of funds on in-house research and development to intensify their knowledge capacity. The South Africa Synthetic Oil Liquid (SASOL) is one such firm as the bulk of its research and development is carried out locally. Consequently, SASOL is supporting both research that aligns with its own strategic agenda and research that addresses both national and global imperatives such as the SDGs. SASOL has traditionally engaged with research-intensive universities which were formerly advantaged institutions. However, in order to respond to the national imperative of equity and redress, a more recent initiative aims to identify centres of excellence in historically disadvantaged universities.<sup>11</sup> The collaboration between the universities and SASOL is done at various levels, from institutional to individual levels, depending on the intellectual property (IP) level of the studies.

Research has demonstrated that while many industries provide financial support for PhDs as a social good, the knowledge at PhD level is regarded variously as 'desirable', 'a luxury' or 'superfluous', with industry in general preferring lower-grade skills. It is suggested that the low level of interest in doctoral education may relate, among other factors, to the 'brain drain' of graduates as many of them seek employment outside South Africa, to the nature of the economy in the country, as well as to the overall low commitment to research and development in South Africa (Herman,

2013). One of the interviewees from the sampled universities supported this argument:

*'I think that if you look at societal challenges, I don't think they would require a doctoral student, they require a relevantly trained practitioner. So if you are looking at issues relating to delivery of energy, delivery of water, I don't think the problems that people are looking for are blue sky, they just want clean, running water. And clean running water can be provided by somebody who has been properly trained with a diploma to be able to put together infrastructure, to provide water to society, and also somebody well trained in order to maintain that particular infrastructure. In terms of doctoral students, I think what it will do is increase our profile internationally as an academic institution, but industry is not looking for doctors.'*

The HRDC (2015) highlights the need to establish industry-related doctoral programmes which will provide employment support for current postgraduate students in an organisation while allowing the students to complete their PhD degree. It also recommends nurturing innovation and commercialisation in research through the development of a host of 'incubator' environments supported by industry and HE, where students can try the development of new business ventures in a low-risk climate, thus supporting the national agenda to encourage the growth of the small, micro and medium enterprise (SMME) sector.

There are three main agencies that aim to promote industry-higher education partnerships, namely, the Technology

10. Statistical Report 2013/14, South African National Survey of Research and Experimental Development. [www.dst.gov.za/index.php/resource-center/rad-reports](http://www.dst.gov.za/index.php/resource-center/rad-reports)

11. Interview with company representative, SASOL 15 July 2016.

and Human Resources for Industry Programme (THRIP), the National Advisory Council on Innovation (NACI) and the Technology Innovation Agency (TIA). The THRIP is funded by the Department of Trade and Industry (DTI). Its main role is the training and production of Science, Engineering and Technology (SET) graduates and to facilitate the three-way partnership between industry, academia and the government. Through THRIP, the DTI offers incentives to industry and academia to collaborate in finding technology solutions and to develop high-level skills in national priorities. While it is a successful programme, it experienced a decrease in the number of participating students between 2006 and 2013. Also, while it has a high proportion of black and female students, these numbers still do not mirror the population demographics of the country.<sup>12</sup> It has also been viewed that THRIP funding tends to be concentrated on large historically advantaged universities with strong SET capability (HESA, 2012). As a consequence, the THRIP strategic plan 2014–15 to 2019–20 sets out to address these issues and to increase participation by historically black universities by targeting individuals and

institutions that have not succeeded in accessing the programme. On average, THRIP supports about 1,000 researchers per annum.

The TIA is a statutory agency under the DST that aims to support the development and commercialisation of competitive technology-based services and products. Its role is to encourage partnerships between SMMEs, industries, universities and science councils to develop an enabling environment that supports sector-specific innovations for global competitiveness and to provide funding for such innovations. It invests in the following technology sectors: advanced manufacturing, agriculture, industrial biotechnology, mining, energy and ICT. The NACI is a government advisory body on science, technology and innovation (NACI, 2016). NACI has identified the water–energy–food security nexus as a focus that responds to the NDP, since water is essential for producing agricultural goods and hydropower, and energy is required to produce and distribute water and food.

The Intellectual Property Rights (IPR) from the Publicly Financed Research and Development Act 51 of 2008 provides regulations for the use of

IP emanating from publicly financed research and development through the National Intellectual Property Management Office (NIPMO), the IP Fund, and Offices of Technology Transfer (OTTs) at selected institutions that were established to support the Triple Helix relationships in South Africa.

There is an identified need to ensure alignment between the various national government departments, professional bodies, industry, quality councils and post-school institutions. It is suggested that lack of collaboration between industry, government and universities results in ad hoc donations and grants that are less effective in advancing the national research priorities. Another challenge has been identified by the universities of technology. While traditionally, as previous technikons, they had a close link with industry, the academic drift with the shift towards attaining the status of university has had a negative impact on these relations. For example, at TUT it is mainly the engineering department and its links with the Engineering Council of South Africa (ECSA) that ensures responsiveness to industry.

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12. THRIP Strategic Plan 2014–15 to 2019–20 – Enhanced industry competitiveness and broadened collaborations generating skills and technologies.

## 8. Funding sources to support and sustain PhD training

The NRF, as the main individual provider of postgraduate bursaries, offers a range of bursaries and scholarships for doctoral education in South Africa (SARUA, 2012). It offers so-called free-standing PhD bursaries on merit for any applicant, provided that the applicant has already been accepted by a South African university for doctoral study. The amount allocated for these bursaries by the NRF in 2017 is R70,000 per annum (about \$5,000) for a period of three years. In cases where grant holders are linked to the Scarce Skills Development Fund (SSDF) and the DST research priorities, the bursaries have a monetary value of R120,000 per annum (\$8,750). Both these amounts are inadequate for students who have to support themselves and a family. Only a small proportion of this financial aid is awarded to students with disabilities. Given our previous observations about the high percentage of international students in the doctoral student body, it is interesting to note that these bursaries and scholarships

are mostly awarded to South African citizens with only a small percentage being allocated to non-South African students. In 2015, there were about 2,000 free-standing NRF bursaries for PhD studies. The NRF also provides funds to support PhD training and research capacity, especially in areas of production that are aligned with the national priorities through other programmes. These include the Thuthuka Research Grant, the NRF incentive fund for rated researchers; and the Knowledge, Interchange and Collaboration (KIC) initiative that supports researchers to attend local and international conferences. Funding is also provided by the other science councils such as the Medical Research Council (MRC), the Agricultural Research Council (ARC), the Human Sciences Research Council (HSRC) and the Council for Scientific and Industrial Research (CSIR). Another source of funding is by the DTI which funds activities focused on commercialisation of research.

Universities also receive funding from industry and international collaborators. The latter includes the Erasmus Mundus programme and Horizon 2020, both funded by the European Union. Some of these programmes have a specific focus. For example, the Gates Foundation focuses on malaria research, while others focus on capacity development training. There is an argument that international funds are restrictive and that universities will benefit more if they are given the flexibility to allocate them to support their specific priorities. At some universities, like UL and TUT, funds are needed to invest in the pipeline and support undergraduate studies, to develop mentorship programmes and mentorship for early career researchers, while other funds may be earmarked to address societal needs such as HIV/AIDS and poverty alleviation.

# 9. The role of international and national collaborations

## 9.1 Rationale for internationalisation

With South Africa's transition to democracy, the process of internationalisation in its various forms expanded significantly. This included a commitment to regional policies and targets within SADC and the African region (e.g. 2010–2011 to 2014–2015 Strategic Plan of the DHET). There is accordingly a strong emphasis on the need for regional collaboration and partnerships and the establishment of regional networks for academic and knowledge exchanges that support South Africa's national priorities. There are multiple initiatives aimed specifically at upgrading staff qualifications and providing support for doctoral students. A report compiled for the Association of Commonwealth Universities (Harle, 2013) suggests that while there are many collaborations and initiatives to support African students, these are dispersed and relatively fragmented. A comprehensive list of these initiatives and their analysis requires consolidation.

The national goal of internationalisation has a strong grounding in the universities' mission. Internationalisation plays an important role in raising both the international standing and ranking of an institution. For example, UKZN positions itself as a 'premier university of African Scholarship',<sup>13</sup> UNISA envisions itself as being 'the African university in the service of humanity',<sup>14</sup> and UP's vision is to become 'a leading research-intensive university in Africa'.<sup>15</sup>

## 9.2 Types of international collaboration in building PhD capacity

Universities promote internationalisation by exposing staff and students to global developments and trends, by facilitating mobility exchanges and encouraging collaborative ventures such as co-supervision of students, co-authorship of papers and joint applications for research grants. The NRF, on behalf of the DST, supports numerous inter-governmental agreements, programmes and strategic partnerships. These include bilateral and multilateral international agreements, agency-to-agency collaboration as well as special projects. The agreements and research activities target postgraduate students, especially PhDs, and an exchange of postdoctoral fellows within approved projects. For example the The German Academic Exchange Service (DAAD) in partnership with the National Research Foundation (NRF) is able to offer scholarships for postgraduate studies at South African universities via the NRF/DAAD Joint In-country Masters and Doctoral Scholarship (NRF 2018). The programme is co-funded by the German Federal Ministry of Economic Cooperation and Development (BMZ) and the National Research Foundation (NRF). The scholarship targets (i) young and rising candidates who aim to acquire master's and doctoral degrees, and (ii) future academic staff sector demands for academically trained personnel, and staff members studying towards a doctoral qualification. Staff members studying towards doctoral qualifications should be enrolled for full-time studies and be exempted from teaching.

According to the NRF Report of 2014–15, 52.4 per cent of Web of Science<sup>16</sup> publications by South African authors are published jointly with international colleagues. This indicates the success of these partnerships and the positive impact they have on the South Africa NSI. Examples of recent partnerships and agreements include arrangements with DAAD; the Swedish Foundation for International Cooperation in Research and Higher Education (STINT), the Academy of Finland Partnership, the NRF/Newton Fund collaboration; the British Council; South Africa and South Korea Bilateral Relations; the China/South Africa Joint Research Programme; South Africa and the Joint Institute for Nuclear Research (JINR); and others. Institutions with low research capacity may find it difficult to forge international collaborations, as these are often directed at research-intensive institutions. In order to access international funds some universities like TUT have formed a consortium with other local universities to enable them to derive more impacts from their collaborations with international institutions.

Local and international agencies and funders have initiated a number of programmes to increase PhD production and research capacities in the previously disadvantaged institutions. Some examples include the pre-PhD project organised by the Programme Support for Pro-Poor Policy Development (PSPPD) and funded by the European Union (EU), which conducted workshops at UL. The other one is the VLIR-UOS Project at UL and UWC, which supports partnerships between universities in Flanders (Belgium) and the Global South looking for innovative responses to global and local challenges.

13. UKZN, Strategic Plan 2007–2016.

14. UNISA 2015 Strategic Plan.

15. University of Pretoria, Strategic Plan, The vision, mission and plan of the University for 2025.

16. Formerly ISI.

South African Universities also explore links with other foreign universities which offer opportunities for split-site doctoral studies. For example the French South African Technical Institute (F'SATI) has established a *cotutelle* doctoral programme with UWC. Similarly, UL and Stellenbosch University have entered into agreements with universities in Europe to offer joint or double doctoral degrees. There was also evidence of collaborations between South Africa's research-intensive universities and their counterparts with low research capacities based on funding support from various government agencies. For example, the University of Stellenbosch has developed training programmes for new supervisors and doctoral students which is supported by NRF funding. The programme has benefited several other institutions. However, there is a view that the allocation of funds based on institutional research outputs creates competition among institutions and stands in the way of collaboration. The following interviewee expressed a strong view that collaborations among higher education institutions in South Africa need to be enhanced through a different funding mechanism:

*'[We need] to find a funding mechanism that forces collaboration between experienced institutions and those that are not experienced. But I know something like that has been done with DHET and there was a lot of window dressing that happened.'*

### 9.3 Student inflow and outflow

Recruiting international postgraduate students, especially from the SADC region, became an explicit national priority expressed in key South African policy documents such as in the National Plan for Higher Education (DoE, 2001: 25) and the NDP 2030 vision (NPC, 2011). In 2014, 40 per cent of all doctoral graduates were international students. In 2005, there were 290 international graduates in South Africa compared with 914 international graduates in 2014, an increase of 215 per cent. During the same period South African graduates showed a growth of only 53 per cent, from 877 graduates in 2005 to 1,344 graduates in 2014. However, the sustainability of this growth is called into question by the protests of the recent past which have created uncertainty in the sector and could possibly lead to international students choosing study destinations other than South Africa.

There is very little information on the number of South African students pursuing their doctoral studies overseas. Data from 2007 indicate that the NRF provided funds for 49 PhD students to pursue their studies at international universities, mainly in the UK and the US, which are the two major destinations for South African students. A concern regarding this development is the possible consequences of brain drain on the PhD students being trained in the developed countries.

Data from the UK (2016–17) indicates that about 260 South African doctoral students were studying in higher education institutions in the UK. However, there was no indication of the number of students who intended to return to South Africa. The data showed that of these students, 85 were self-financing while 70 had fee waivers from their study institutions.<sup>17</sup> Based on previous trends, many of these students are unlikely to return to South Africa unless there are incentives for them to do so. Graduation rates were, however, available from the US. In 2005, 52 South African doctoral students graduated from American universities. More than half of these intended staying on in the US (Hoffer, et al 2007: 96.). There is no parallel data for 2014 since South Africa was not included in the top 40 countries of origin.

17. Higher Education Statistics Agency (HESA) Student Record 2016–17.

# 10. Conclusion

This report has analysed the status of research and PhD training capacity in South Africa within the context of the terms of reference of the study. It has shown that South Africa has a clear national agenda for research and PhD training that informs strategies for development at both national and institutional levels. This national agenda is supported by various policy documents, special government initiatives and programmes that are supported with requisite resource allocation. There is also evidence of improvements in alignment of policies between different government departments, and a stronger sense of commitment to implementation. These developments also have impacts on the institutional policies of the universities. An example is the nGAP policy for increasing supervisory and research capacity (DHET, 2014b) which has a clear implementation plan and resource allocation and is currently implemented in universities across South Africa. The nGAP has the potential to create a pipeline for the PhD and to develop the next generation of academics. Another example of policy is the funding framework (NFF) which forces universities to produce more research.

The report also shows that PhD training in South Africa is driven by the pursuit of equity to redress apartheid inequalities in terms of race and gender. At the same time, some policies such as the NDP (NPC, 2011) emphasise economic development to enable South Africa to become a global player in the knowledge economy. The aspiration to simultaneously achieve economic growth and redress historical inequalities has raised many challenges and at times even necessitated a compromise between access and quality. Subsequently, although universities are looking outside for talent and skills, they have to give priority to local candidates when employing academics or funding doctoral students.

Through the various funding mechanisms the government is steering universities towards the national research priorities. In return, the universities are aligning their strategic plans and visions with major government policies. This also enables them to develop niche areas based on their capacities and expertise. The universities' response to government's steering mechanisms, while positive and responsive, raises the question of the extent to which steering affects academic autonomy of the universities. Should universities merely be responsive to the whims of government, or should they lead the research agenda?

It has also been evident that the universities are aligning their institutional agenda to regional policies, such as the SADC protocol, the African Union agenda, and with the global agenda such as the SDGs. All these agendas aim to make knowledge production and human resource development in these institutions nationally and internationally relevant. They call for increasing research capacity and skills and investing in doctoral education. South Africa plays a significant role in developing research in the region. Crucial knowledge and capacity focusing on social issues such as alleviating poverty, providing education and employment, as well as issues related to water, climate change, and food and energy security among others, are produced.

South African higher education is to a large extent an undergraduate system. This limits the doctoral pipeline. Despite this limitation, South Africa significantly increased its postgraduate output between 2005 and 2014. This has been attributed to several strategic plans and policy documents that support and fund PhD production. In this report we suggest that the national target of 5,000 graduates per annum in 2030 could be reached if the rate of increase in the period 2005 to 2014 is maintained. However, the aspiration

to have most of the doctorates produced by 2030 in science, technology, engineering and mathematics, which is deemed necessary in order to achieve the national priorities, may be more difficult to achieve.

There is a commendable change in students' demographic composition both in terms of gender and race. However, there is a slow change in the number of black South Africans obtaining PhDs which suggests that transformation in terms of equity and diversity will be difficult to achieve in the short term. Universities struggle to recruit black South African candidates into doctoral programmes. One of the reasons is that the available funds are inadequate to support full-time black students who have family responsibilities.

The need to increase supervisory capacity to support the doctoral graduation targets is a major challenge to some South African institutions. In this report we suggest that universities may struggle to achieve the government target of 75 per cent of permanent academic staff with a PhD by 2030, since many academics are due to retire in the next decade. Consequently, most institutions encourage, support and even pressurise academic staff to obtain a PhD degree. However, retaining good academic staff is another challenge for some universities, owing to the relatively low salaries, expanding student numbers and consequent workloads, as well as institutional culture issues. Furthermore, universities are currently working in volatile and uncertain contexts due to student protests demanding free education.

Knowledge production capacities are not evenly distributed in South African universities. Production of doctoral graduates is being skewed towards the historically advantaged universities. Nine such institutions, out of the total of 26, produced 79 per cent of all PhD

doctoral graduates in 2014, while the previously disadvantaged universities and universities of technology are mainly undergraduate institutions with very low research capacity. Universities with low capacity for research focus on teaching and find it challenging to develop the postgraduate pipeline and increasing supervisory capacity. Subsequently, they struggle to produce research and develop niche areas in line with the national priorities and to access the available funds.

There are stringent national and institutional policies to ensure the quality of PhD training in South Africa. These include the processes of selection of students, development of research proposals, ethical clearance for research, the supervision process and the examination of the thesis. However, multiple challenges are experienced, including unprepared students and inadequate supervisory capacity. As shown in the report, the pressure on universities to produce more PhDs in a shorter completion time may have a negative impact on quality. Currently, completion rate is below 50 per cent, while time to completion is five years.

There are a myriad of institutional, national and international initiatives to support the national priorities. The main players in higher education in South Africa, namely, the NRF, the DST and the DHET, have developed various initiatives to enable institutions to meet the national agenda. In particular, the Centres of Excellence (CoEs), the South African Research Chairs Initiative (SARChI), and the National Facilities (NFs) are well funded by the NRF/DST and have proven to be highly effective in addressing the need to develop research capacity and build the next generation of academics.

There is significant growth in collaborations between industry and universities, especially in research-intensive institutions. The firms that co-operate with universities spend significant amounts of funding on in-house research and development to intensify their knowledge capacity. However, it is observed that since the South African economy is still very much a low-skill, mineral extraction, export-dominated model with low commitment to research and development, a PhD is not always a priority. The academic drift of the universities of technology has negatively affected their traditional link with industry. Better collaboration between industry, government and universities is required, as well as the production of industry-based PhDs, linked to the national priorities. Furthermore, South African total (public and private sector) gross domestic expenditure on research and development (GERD) has declined from 0.89 per cent in 2008 to approximately 0.73 per cent (government 43.1 per cent of total percentage) of GDP. Increasing levels of research and development could result in increased research capacity.

The bulk of the research funding in most South African universities comes from government subsidies and development grants. This source of funding mainly benefits research-intensive institutions, while universities with low research productivity have unused development funds as there are no suitable candidates for these grants. The NRF is the main funder of PhD training and research, especially in areas aligned to national priorities. There are also international agencies such as the DAAD, the British Council and the EU that augment government funding to research and PhD training. Universities also receive some funding from industry, national and international

donors and through various collaborations. It is noted, however, that (i) the NRF bursaries and scholarships for doctoral education are inadequate for students, especially black students who have to support themselves and a family; (ii) most funds are allocated to South African students while international students find it hard to access funding; and (iii) funding from international collaborators is sometimes restrictive and may require a matching fund from the institutions which has a negative impact on the ability of universities with low research capacity to access these funds.

Internationalisation is recognised as having a strong impact on universities' missions and in raising both the international standing and ranking of institutions. South Africa is increasingly becoming a hub for doctoral education in Africa. The number of international doctoral students is increasing annually and currently accounts for 40 per cent of all doctoral students. Universities are actively pursuing international collaborations. The NRF supports numerous inter-governmental agreements, programmes and strategic partnerships. The increase in the number of collaborative publications in Web of Science accredited journals is evidence of the success of these partnerships and the positive impact they have on the South African NSI. International agencies and funders have initiated a number of programmes to increase capacity in the previously disadvantaged institutions and to train early-career researchers. These include joint or double doctoral degrees. At the same time collaboration between South African institutions to enhance research is limited, owing to competition between them and the absence of a funding mechanism that promotes such initiatives.

# 11. Recommendations

The above discussion offers several insights into the state of research and PhD training capacity in South Africa, from which important lessons can be learned, forming the basis for the following recommendations:

As South Africa provides a good example of policy alignment between its national research agenda, adopted policies, and institutional policies and practices, it is recommended that future policies on doctoral education and research capacity building should continue to demonstrate commitment through alignment with other policies and allocation of adequate funds to support the processes.

While the building of capacity for research and doctoral education across all institutional types is pursued, South Africa needs to review and consider whether all institutions should be research intensive or whether a differentiated higher education landscape would be better. Universities, especially those with emerging or low capacity for research, could benefit from funds and expertise to develop niche areas.

Universities with low research and PhD production capacities need urgent intervention to enhance their capacity in the short term to allow them to develop their own research and supervisory talent.

This could involve bringing experienced academics and researchers to the institutions for some period of time, such as sabbaticals, to work with current supervisors and to develop research proposals. This could include retired academics from international and national institutions.

Despite the strides South Africa is making in investing in research and development and research capacity development, it is still spending less on research and development relative to other countries at the same level of development. Increasing research and development expenditure to one per cent of GDP would help to increase competitiveness of research outputs.

Initiatives for increasing supervisory capacity should focus more on targeted areas that respond to the national priorities such as the science, engineering and technology fields.

In order to increase PhD outputs, a funding model that sufficiently supports the varied needs of local students needs to be put in place. This could redress the growing drop-outs and lead to better completion rates.

Stronger and more productive collaboration between universities, government and industry is required. This could be addressed by development of industry-based PhDs and increased innovation

and commercialisation of research outcomes to meet the needs of industry.

National collaboration among higher education institutions in South Africa needs to be enhanced through different academic activities and funding mechanisms.

The unique strengths, expertise and needs of universities should be considered when donor partnerships are developed. Donor funding needs to align itself with the unique needs of each university.

Given the role played by South Africa as a regional hub for training doctoral students, one could recommend its replication in other parts of the continent with a view to developing research and postgraduate training capacity in those regions.

Based on the South African experience we suggest that in order to improve PhD production in Africa, funds and human resources should be allocated to create Centres of Excellence and Research Chairs. These could help develop PhDs and research capacities for institutions in other parts of Africa where capacities could be inadequate.

The South African processes for ensuring quality and ethical research could be used as a model by other institutions in Africa, in order to produce PhDs that have practical and scholarly value.

# References

- Academy of Science for South Africa (ASSAf) (2010) *The PhD study: An evidence-based study on how to meet the demands for high-level skills in an emerging economy*. Pretoria: ASSAf.
- Breier, M and Herman, C (2017) The PhD conundrum in South African academia. *Higher Education Quarterly* 71/4: 352–368.
- Cloete, N, Mouton, J and Sheppard, C (2015) *Doctoral education in South Africa*. Cape Town: African Minds. Available at: [Doctoral-Education-in-South-Africa-WEB.CloeteMouton-3.pdf](#)
- Council on Higher Education (CHE) (2010) *Community engagement in South African higher education*. Kagisano No6.
- Council on Higher Education (CHE) (2013) *The Higher Education Qualifications Sub-Framework*. Pretoria: Council on Higher Education.
- Department of Education (DoE) (1997) *Education White Paper 3: A Programme for the transformation of higher education*. General Notice 1196 of 1997. Pretoria: Department of Education.
- Department of Education (DoE) (2001) *National Plan for Higher Education*. Pretoria: Ministry of Education. Available online at: [http://chet.org.za/manual/media/files/chet\\_hernana\\_docs/South%20Africa/National/National%20Plan%20for%20HE%20SA.pdf](http://chet.org.za/manual/media/files/chet_hernana_docs/South%20Africa/National/National%20Plan%20for%20HE%20SA.pdf)
- Department of Education (DoE) (2003) *Policy and procedures for measurement of research output of public higher education institutions*. Pretoria: DoE.
- Department of Higher Education and Training (DHET) (2013) *White Paper for Post-School Education and Training: Building an expanded, effective and integrated post-school system*. Pretoria: DHET.
- Department of Higher Education and Training (DHET) (2014a) *White Paper for Post-school Education and Training: Building an expanded effective and integrated post school system*. Government Notice 37229 of 2014. Pretoria: Department of Higher Education and Training.
- Department of Higher Education and Training (DHET) (2014b) *Staffing South Africa's Universities Framework (ASSUF)*. Pretoria: DHET.
- Department of Higher Education and Training (DHET) (2014c) *Ministerial Statement on Student Enrolment Planning 2014–15 to 2019–20 for Universities*. Pretoria.
- Department of Science and Technology (DST) (2002) *South Africa's National Research and Development Strategy (NRDS)*. Pretoria: Department of Science and Technology.
- Department of Science and Technology (DST) (2008) *Innovation towards a knowledge-based economy: Ten-Year Innovation Plan 2008–2018*. Pretoria: Department of Science and Technology.
- Department of Science and Technology (2016) *Statistical Report 2013/14, South African National Survey of Research and Experimental Development*. Available online at: [www.dst.gov.za/index.php/resource-center/rad-reports](http://www.dst.gov.za/index.php/resource-center/rad-reports)
- Harle, J (2013) *Doctoral education in Africa: A review of doctoral student needs and existing initiatives to support doctoral training and research development*. The Association of Commonwealth Universities.
- Herman, C (2013) Industry perceptions of industry–university partnerships related to doctoral education in South Africa. *Industry and Higher Education* 27/3: 217–225.
- Higher Education Qualifications Sub-Framework (HEQSF) (2013) *Publication of the General and Further Education and Training Qualifications Sub-Framework and Higher Education Qualifications Sub-Framework of the National Qualifications Framework*. *Government Gazette* Vol. 578. Pretoria, 2 August, No. 36721.
- Higher Education South Africa (HESA) (2011) *Proposal for a national programme to develop the next generation of academics for South African higher education*. Pretoria: HESA.
- Higher Education South Africa (HESA) (2012) *Promoting higher education – Industry partnerships and collaborations: A report to the research and innovation strategy group Higher Education South Africa*. Pretoria: HESA.
- Hoffer, T, Hess, M, Welch, V and Williams, K (2007) *Doctorate Recipients from United States Universities: Summary Report 2006*. Chicago: National Opinion Research Center.
- Human Resources Development Council (HRDC) (2013) *Status of the bursary/scholarship funding landscape in South Africa*. HRDC.
- Human Resources Development Council (HRDC) (2015) *Production of academics and strengthening of higher education partnerships with industry (PASHEPI)*.
- National Advisory Council on Innovation (NACI) (2016) *Strategic Plan 2016–2021 and Annual Performance Plan 2016/17*. NACI.

- National Planning Commission (NPC) (2011) *National Development Plan: Vision for 2030*. Available online at: [www.gov.za/sites/www.gov.za/files/devplan\\_2.pdf](http://www.gov.za/sites/www.gov.za/files/devplan_2.pdf)
- National Research Foundation (NRF) (2007) *Annual Report 2006/2007: briefing*. Available online at: <https://pmg.org.za/committee-meeting/8465/>
- National Research Foundation (NRF) (2011) *Scaling up the South African research enterprise, 2011–2020*. Pretoria: NRF.
- National Research Foundation (NRF) (September 2012) *Five-year review of the South African research chairs initiative (SARChI)*.
- National Research Foundation (NRF) (2014) *Sabbatical grants to complete doctoral degrees*. Available online at: <https://nrfs submission.nrf.ac.za/nrfmkii/FormView.aspx?AttachmentId=165194>.
- National Research Foundation (NRF) (2015) *Annual Report 2014–2015*. Pretoria: National Research Foundation.
- National Research Foundation (NRF) (2016a) *Centres of Excellence*. Pretoria: NRF. Available online at: [www.nrf.ac.za/division/rcce/instruments/centre-of-excellence](http://www.nrf.ac.za/division/rcce/instruments/centre-of-excellence)
- National Research Foundation (NRF) (2016b) *Professional Development Programme: Framework Document*.
- National Research Foundation (NRF) (2018) *DAAD/NRF Joint In-Country Masters and Doctoral Scholarship 2018*. Available online at: [www.nrf.ac.za/content/daadnrf-joint-country-masters-and-doctoral-scholarship-2018](http://www.nrf.ac.za/content/daadnrf-joint-country-masters-and-doctoral-scholarship-2018)
- Singh, RJ (2015) Challenges and successes of research capacity building at a rural South African university. *South African Journal of Higher Education* 29/3: 183–199.
- Southern African Regional Universities Association (SARUA) (2012) *Doctoral education: Renewing the academy*. SARUA Leadership Dialogue Series.
- Taylor, N and Shindler, J (2016) *Education Sector Landscape mapping – South Africa*. JET Education Services.
- Teferra, D (2015) Manufacturing and exporting excellence and ‘mediocrity’: Doctoral education in South Africa. *South African Journal of Higher Education* 29/5: 8–19.
- Thaver, B and Holtman, L (2015) A response to Yusef Waghid’s leading article. *South African Journal of Higher Education* 29/5: 20–28.
- UNESCO (2015) *UNESCO Science Report: Towards 2030*. UNESCO.
- University of KwaZulu-Natal. (UKZN). *Strategic plan 2007–2016*. Available online at: [www.ukzn.ac.za/publications/strat%20plan%20low%20res.PDF](http://www.ukzn.ac.za/publications/strat%20plan%20low%20res.PDF)
- University of Limpopo (UL) (2015) Research Administration and Development Department, Annual Report 2015.
- Universities South Africa (2014) *Strategic Framework for Universities South Africa, 2015–2019*. Available online at: [www.universitiessa.ac.za/sites/www.universitiessa.ac.za/files/Strategic%20Framework%20for%20Universities%20South%20Africa,%202015-2019.pdf](http://www.universitiessa.ac.za/sites/www.universitiessa.ac.za/files/Strategic%20Framework%20for%20Universities%20South%20Africa,%202015-2019.pdf)
- Universities South Africa (USAF) (2016) *Universities funding in South Africa: A fact sheet*. Available online at [www.uct.ac.za/usr/news/downloads/2016/UniversitiesFundingSouthAfrica\\_FactSheet.pdf](http://www.uct.ac.za/usr/news/downloads/2016/UniversitiesFundingSouthAfrica_FactSheet.pdf)
- Waghid, Y (2015) Are doctoral studies in South African Higher Education being put at risk? *South African Journal of Higher Education* 29/5: 1–7.
- Wingfield B (2011) Can we improve postgraduate degree throughput rates? *South African Journal of Science* 107: 11–12.



