

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

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International
Higher Education

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Acknowledgements

The German Academic Exchange Service (DAAD) in partnership with the British Council conceived this research project and co-funded it together, with support from the German Federal Ministry of Education and Research.

The overall study was commissioned to the African Network for Internationalisation of Education (ANIE), and their network of researchers across Sub-Saharan Africa. In particular, the work of the following individuals should be acknowledged:

James Jowi and Dr Charles Ochieng Ong'ondo for their oversight of the role of ANIE; and Professor Lilian-Rita Akudolu, Faculty of Education, Nnamdi Azikiwe University, Awka, Nigeria, together with Kolawole Samuel Adeyemo, PhD, Department of Education Management and Policy Studies, University of Pretoria, South Africa for leading the research in Nigeria.

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.

WITH FINANCIAL
SUPPORT FROM



**Federal Ministry
of Education
and Research**

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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 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 1972¹ 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 ⁱ	40	44	69	153	1,131,312	58.4
Polytechnics ⁱⁱ	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 ⁱⁱⁱ	21	46	17	84	354,387	18.3
Total	131	189	183	503	1,937,493	100

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
Total	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).² 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

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

- 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.

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