

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

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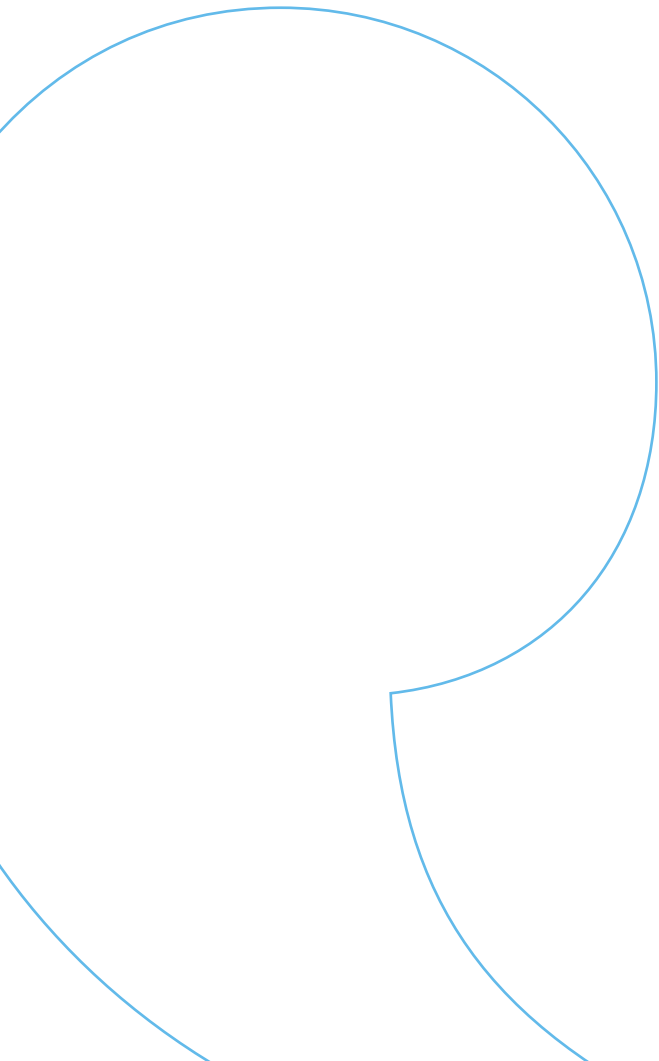
ANIE led the empirical research and produced the initial analysis, and then worked together with Dr Tristan McCowan and Elisa Brewis at University College London Institute of Education to finalise this country report.

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,¹ while a synthesis report is also available highlighting the key policy implications for PhD provision specifically.² 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.

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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).

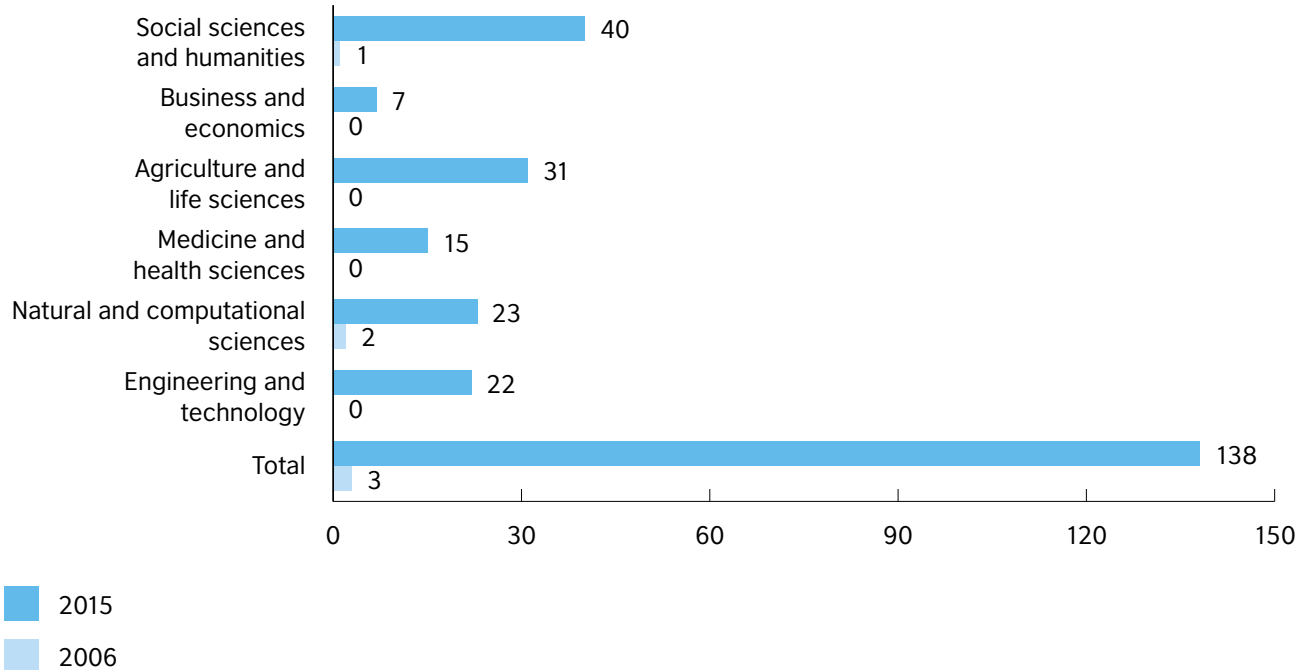
Despite the efforts made to expand PhD production, the numbers of staff with PhD qualifications has not been commensurate with the increase in student enrolment and rapid growth in number of universities (Ministry of Education, 2016). Currently, the staff qualification mix for universities is 32:60:8 (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
Total		7	335	100

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
Total	7	10	19	15	149	21	76	115	152	335	100	899	100

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

Table 8 continued

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

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.

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