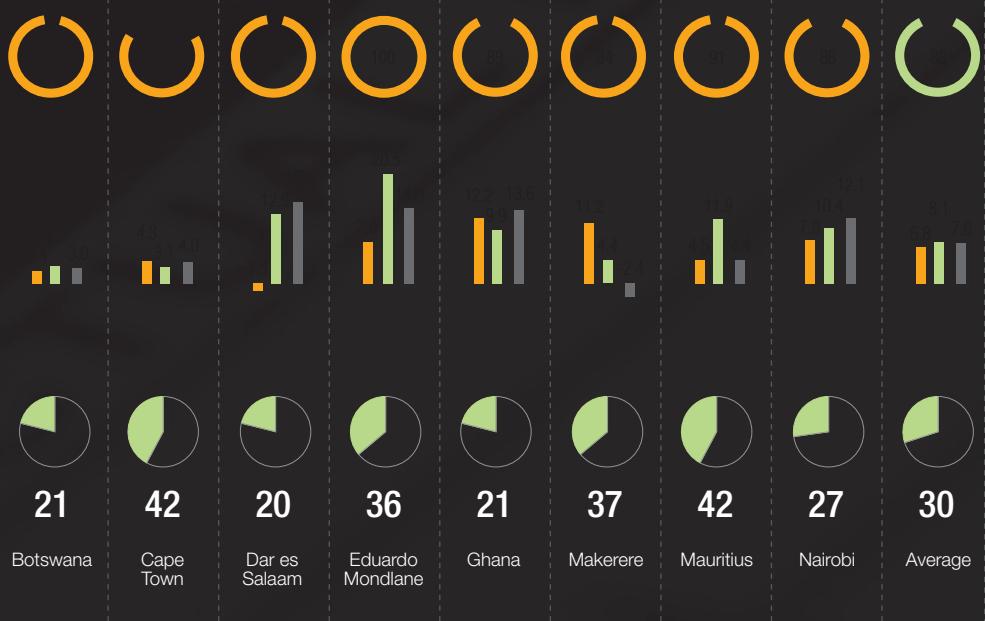


A Report of the Higher Education Research and Advocacy Network in Africa

AN EMPIRICAL OVERVIEW OF EIGHT FLAGSHIP UNIVERSITIES IN AFRICA

2001–2011



Ian Bunting, Nico Cloete & François van Schalkwyk

An Empirical Overview of Eight Flagship Universities in Africa

2001–2011

Report compiled by
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All data published in this report are available at www.chet.org.za/data
Data can be downloaded free of charge and may be re-used subject only to the acknowledgement of the Centre for Higher Education Transformation (CHET) as the source of the data.

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Dr Nico Cloete
Director: CHET

About the data in this report

Data were obtained directly from each of the eight universities participating in the HERANA project. The quality of the data presented in this report is therefore dependent to a large degree on the accuracy of the institutional data submissions. The data were supplied by the institutions and the formatted data tables were checked by the institutions on two separate occasions.

Institutions are welcome to submit to CHET further corrections and updates which may have become evident since the last checks made in 2013.

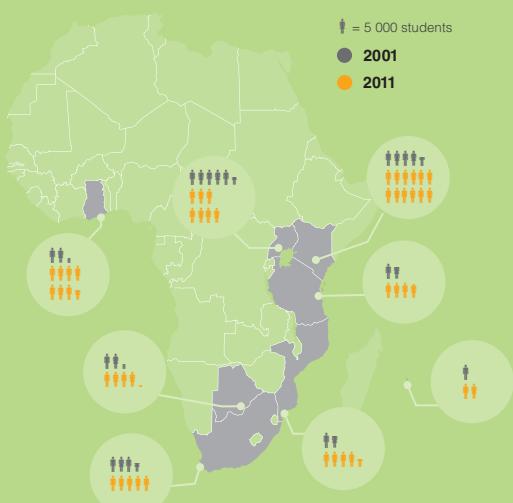
Acronyms and abbreviations

Botswana	University of Botswana
Dar es Salaam	University of Dar es Salaam (Tanzania)
Cape Town	University of Cape Town (South Africa)
CHET	Centre for Higher Education Transformation
Eduardo Mondlane	Eduardo Mondlane University (Mozambique)
FTE	Full-time equivalent
Ghana	University of Ghana
HEMIS	South Africa's Higher Education Management Information System
HERANA	Higher Education Research and Advocacy Network in Africa
Makerere	Makerere University (Uganda)
Mauritius	University of Mauritius
Nairobi	University of Nairobi (Kenya)
OECD	Organisation for Economic Cooperation and Development
PQM	Programme and qualification mix
SET	Science, engineering and technology
US	United States of America

Key indicators 2001–2011

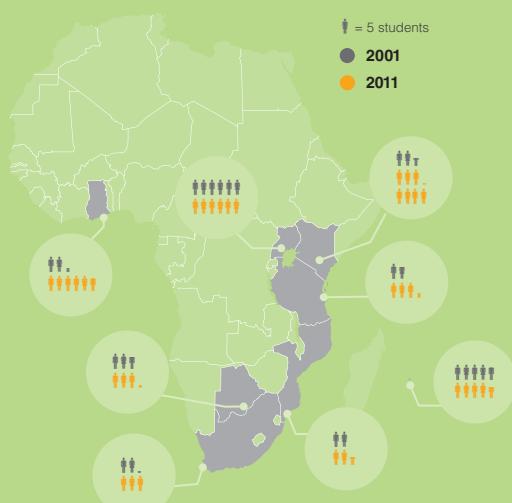
Enrolments

Total head count enrolments 2001 & 2011



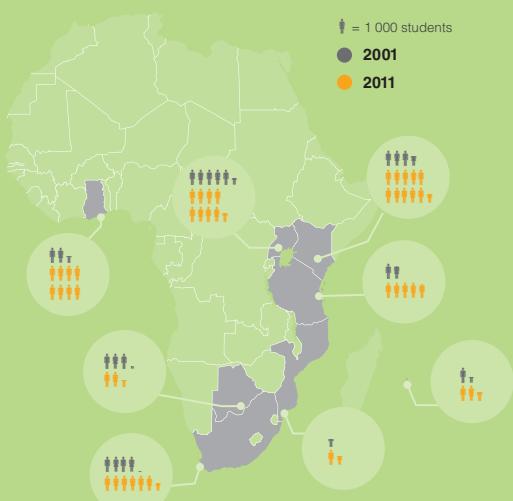
Student:staff ratios

FTE students per FTE academic 2001 & 2011



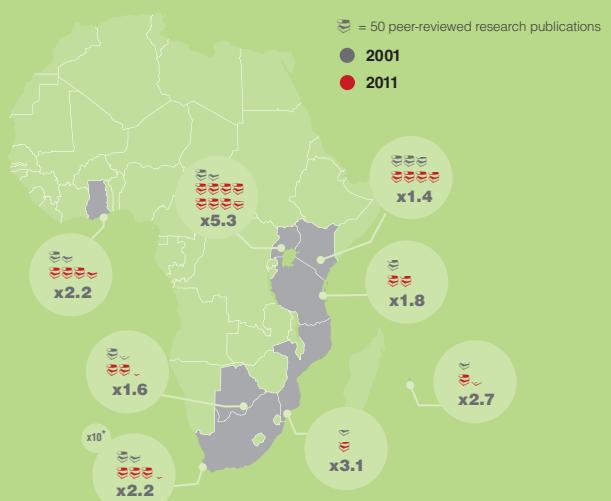
Graduates

Total graduates 2001 & 2011



Publications

Increase in research articles between 2001 & 2011



* 50 = 500 publications

1 Introduction

Cross-national higher education data projects

This report is the second in which the Centre for Higher Education Transformation (CHET) discusses the collecting and analysis of cross-national higher education data in Africa. CHET's first report was published as *Cross-National Performance Indicators: A Case Study of Eight African Universities* (2012). It discussed the development of performance indicators for a group of eight 'flagship' universities which are listed in Table 1.

CHET described these eight universities as 'flagships' because each is the most prominent public university in its country, and because all of the universities have broad 'flagship goals' built into their vision and mission statements. Each of the eight universities aims to:

- have a high academic rating, which would make it a world-class university or at least a leading or premier university in Africa
- be a centre for academic excellence
- engage in high-quality research and scholarship
- deliver knowledge products which will enhance both national and regional development.

The 2012 publication on cross-national performance indicators offered an overview of the student and academic staff inputs and outputs of the eight universities based on quantitative data for 2001 to 2007. The same group of eight flagship universities has been included in this new report which extends the overview to cover an eleven-year period from 2001 to 2011.

This new report consists primarily of descriptive analyses of the student enrolments, academic staff and knowledge outputs of the eight universities. Section 5 of the report contains some analyses of performance which focus on the links between high-level academic staffing resources and high-level knowledge outputs. New sets of performance indicators are being developed as CHET moves ahead with analyses of the academic core of the eight universities.

Table 1: Flagship universities selected by the project

UNIVERSITY	COUNTRY
University of Botswana	Botswana
University of Cape Town	South Africa
University of Dar es Salaam	Tanzania
Eduardo Mondlane University	Mozambique
University of Ghana	Ghana
Makerere University	Uganda
University of Mauritius	Mauritius
University of Nairobi	Kenya

Initial collection of data (2001–2007)

The participating universities agreed, during 2007, to complete data tables which were sent to them by CHET. These tables requested data for 2001 to 2007 in the following broad categories:

- head count student enrolments
- full-time equivalent student enrolments
- graduates
- permanent academic and administrative staff
- academic staff qualifications
- full-time equivalent academic staff
- research outputs in the form of doctoral graduates and research publications
- income and expenditure in local currency and in US dollar at market rates.

CHET found that many of the first data tables returned were inconsistent and incorrect. It decided to resolve the problems by sending a task team to the universities concerned to discuss data requirements, and to collect as much raw data as possible on-site. The task team visited seven universities during 2008. The task team found that the main reasons for the poor quality of the initial data submissions were:

1. Some of the eight case study universities could not extract the data in the formats requested by CHET because they did not have appropriate or functional electronic student and staff databases. The data were often available only in the form of summarised tables in print format.

2. Where electronic databases were in place at the university, the data were often incomplete, classifications were inaccurate, and student enrolment and graduate sets were incomplete.
3. A number of the universities had no central management information office in which complete sets of the data were stored either in electronic or hard copy format. One consequence of this decentralisation was that different versions of data on students and staff were held by the various operational units of some universities.
4. Various key concepts in higher education information systems were not used by some of the universities. The data elements needed to make calculations for key performance indicators were, as a result, not available from these universities.

CHET's data task-team resolved these initial data problems in a number of different ways. It copied available electronic student unit records and subjected these to detailed analyses once the team had returned to South Africa. The task team also used printed and internet copies of institutional annual and planning reports to correct and verify the data which had been submitted by the universities. The task team remained in e-mail contact with project co-ordinators at each university, and was able to achieve agreement on a consistent set of data tables for the eight universities by the end of 2010. It is clear from the engagement between the task team and the universities that the capacity of the universities to collect and prepare data had improved significantly over the period of the engagement.

Collection of research output data (2008–2011)

In its analyses of research outputs for 2001 to 2007, CHET in collaboration with the Centre for Research on Evaluation, Science and Technology (CREST), extracted from the ISI's arts and humanities, social science, and science-expanded citation indexes all papers that contained at least one author whose address was that of one of the eight flagship universities. If the authors of a research publication recorded on a citation index were employed by different universities, then full publication units were assigned to each of the universities concerned. This methodology was applied again to the collection of research data for 2008 to 2011.

Collection of enrolment, graduate and staff data (2008–2011)

Because of the problems which had been encountered with data for 2001 to 2007, CHET decided to adopt a new method for the collection of 2008 to

2011 data on enrolments and graduates. This new process relied, not on the participating universities completing fairly rigid student and staff tables, but rather on them providing flexible data sets from which a wider range of tables and performance indicators could be extracted by CHET's researchers.

The initial and fundamental step was reaching agreement on programme and qualification mix (PQM) schedules for the eight universities. These PQM schedules listed by name or title all the degrees, diplomas and certificates which each university offered during 2008 to 2011. These lists were organised, first of all by qualification type, and then by fields of study. The qualification types used were straightforward: undergraduate, postgraduate below masters level, masters, and doctors.

The fields of study categories were more complex. The four basic categories used in 2001 to 2007 were (a) science, engineering and technology, (b) business and management, (c) education, and (d) humanities and social sciences. CHET decided, for the 2008 to 2011 collection process, to retain these four broad subject matter categories, but to divide them into a number of sub-categories to offer fuller accounts of the range of subject matter offered by the eight universities. This more detailed subject classification system was based on that used in South Africa's higher education management and information system (HEMIS).

The HEMIS subject matter classification system has a hierarchical structure which consists of 20 first order categories, each of which is divided into second order categories which define key sub-fields. The second order categories are divided in turn into third order categories which define what could be described as sub-sub-fields. CHET's adaptation of the HEMIS system uses the 20 first order categories, but only a limited number of the second order sub-categories. The 20 first order categories, which have been placed into the four broad subject matter groups used for the 2001 to 2007 study, can be seen in Table 2.

CHET divided the ten first-order categories in SET (science, engineering and technology) into a total of 100 second-order categories, the single first-order category in BUS (business, economics and management studies) into 13 second-order categories, and the single first-order category in EDU (education) into eleven second-order categories. The nine first-order categories in HUM (humanities and social sciences) were divided into 37 second-order categories making the overall totals 20 first-order and 161 second-order categories into which the fields of study of the eight universities were placed.

CHET's next step was to use the details of qualifications and major subjects which each university had provided in 2007 to draw up first drafts of their PQM schedules. The drafts were sent to universities in the middle of 2012, together with manuals containing instructions and definitions of the fields of study. Universities corrected and returned updated versions of their PQMs during July and August 2012.

Table 2: First order subject classification employed (2008–2011)

HERANA FIRST ORDER CODE	DESCRIPTION OF FIRST ORDER CATEGORY
Seto1	Agriculture, Agricultural Operations and Related Sciences
Seto2	Architecture and the Built Environment
Seto3	Computer and Information Sciences
Seto4	Engineering
Seto5	Health Professions and Related Clinical Sciences
Seto6	Family Ecology and Consumer Sciences
Seto7	Life Sciences
Seto8	Physical Sciences
Seto9	Mathematics and Statistics
Seto10	Military Sciences
Buso1	Business, Economics and Management Studies
Eduo1	Education
Humo1	Visual and Performing Arts
Humo2	Communication, Journalism and Related Studies
Humo3	Languages, Linguistics and Literature
Humo4	Law
Humo5	Philosophy, Religion and Theology
Humo6	Psychology
Humo7	Public Management and Services
Humo8	Social Sciences

Note: SET = Science, engineering and technology
 BUS = Business, economics and management studies
 EDU = Education
 HUM = Humanities and social sciences

After they had been checked again by CHET, these PQMs became the basic data collection documents for enrolment and graduate data for 2008 to 2011. The PQMs were converted into spreadsheet templates in which each row contained (a) the name of a qualification and its type, (b) the first and second order subject categories with which it was linked, and (c) its full-time and part-time student enrolments and its graduates for each year of the period 2008 to 2011. Instructions on the completion of the templates were also sent to universities.

This process relieved universities of the task of having to produce the detailed and complex student and graduate tables previously required by CHET. Most universities were able to return the completed and checked enrolment and graduate data tables within three months.

A manual containing definitions and guidelines for the reporting of staff data was sent to universities during July 2012. The staffing data templates which universities were requested to complete were included with the manuals of instructions. Most universities were able to complete and return their staffing data by October 2012.

The outcome of the revised process was that CHET was able to compile the first analyses of student and staff data for 2008 to 2011 about six months after starting the process, compared to the close to two years taken with the collection of data for 2001 to 2007.

Further introductory points

Two additional points about the contents of this report should be noted:

1. Most of the universities listed in Table 1 have academic years which cross two calendar years. To simplify the figures and tables which follow, all academic years have been equated to calendar years by taking 2000/2001 to equal 2001, 2001/2002 to equal 2002, up to 2010/2011 equals 2011. If a university has an academic year that coincides with a calendar year, then its 2001 academic year will equal 2001, the 2011 academic year will equal 2011, and so on.
2. Each main section of the paper begins with a text box which offers a brief summary of the main points raised in that section. The main points in the summary will appear again in the overall summary in the paper's concluding section.

2 Head count student enrolments

Summary

- Total student enrolments doubled between 2001 and 2011. Individual growth rates differed widely; ranging from high average annual growth rates of 13% for Ghana, 12% for Eduardo Mondlane and 10% for Nairobi, to more moderate growth rates of 6% for Mauritius, 4% for Cape Town, 3% for Botswana and 2% for Makerere.
- The eight universities remained primarily undergraduate institutions throughout the period 2001 to 2011. Only Cape Town had a postgraduate proportion above 30% in 2011.
- The largest overall average annual growth between 2001 and 2011 occurred in the combined totals of the business, management and economics programmes of the eight universities. One effect was that the undergraduate plus postgraduate proportion of total enrolments in science and technology programmes fell from 32% in 2001 to 30% in 2011. In 2011 only Mauritius and Cape Town had proportions of science and technology students above the target of 40% which HERANA had suggested for the period 2001 to 2007.
- Total masters enrolments increased from 9 600 in 2001 to 25 600 in 2011, an average annual growth rate of 10%. Masters enrolments at Ghana and Nairobi trebled between 2001 and 2011, and trebled at Eduardo Mondlane between 2007 and 2011. The largest growth occurred in masters programmes in business, management and economics, which had a 39% share in 2011 of the masters students of the eight universities, compared to the 32% share of masters programmes in science and technology.
- Doctoral enrolments increased at an average annual rate of 8% over the period 2001 to 2011. Sharp growths were recorded in particular by Ghana (up from 67 in 2001 to 316 [a 472% increase] in 2011) and by Makerere (up from 26 in 2001 to 563 [a 2165% increase] in 2011).
- The enrolment data indicate that issues of access equity by gender occurred in all eight universities. For example, in 2011 only three universities – Mauritius, Botswana and Cape Town – had female proportions of 50% or above in undergraduate programmes, while four universities had undergraduate female proportions below 40%. These four were Ghana, Dar es Salaam, Nairobi and Eduardo Mondlane. Only one university, Botswana, reported a proportion of more than 50% for female students at masters level. The average female enrolment in doctoral programmes across the eight universities was 37% in 2011.

Total student enrolments

Figure 1 summarises the enrolment totals of the eight universities over the period 2001 to 2011. These totals are head counts, which treat each student as a unit regardless of the course load he/she is carrying.

Figure 2 compares average annual growth rates over three periods: 2001 to 2007, 2007 to 2011, and for the full period of 2001 to 2011. The data in the figures show that the combined student enrolment total of the eight universities doubled over the eleven-year period, rising from 112 000 in 2001 to 227 000 in 2011. The eight universities did however fall into two distinct groups: one in which overall enrolments between 2001 and 2011 grew at average annual rates of 9% and higher, and a second in which average annual growth rates were 6% and below. Botswana and Makerere had growth rates of between 2% and 3%, and Cape Town had an average annual growth rate of 4%.

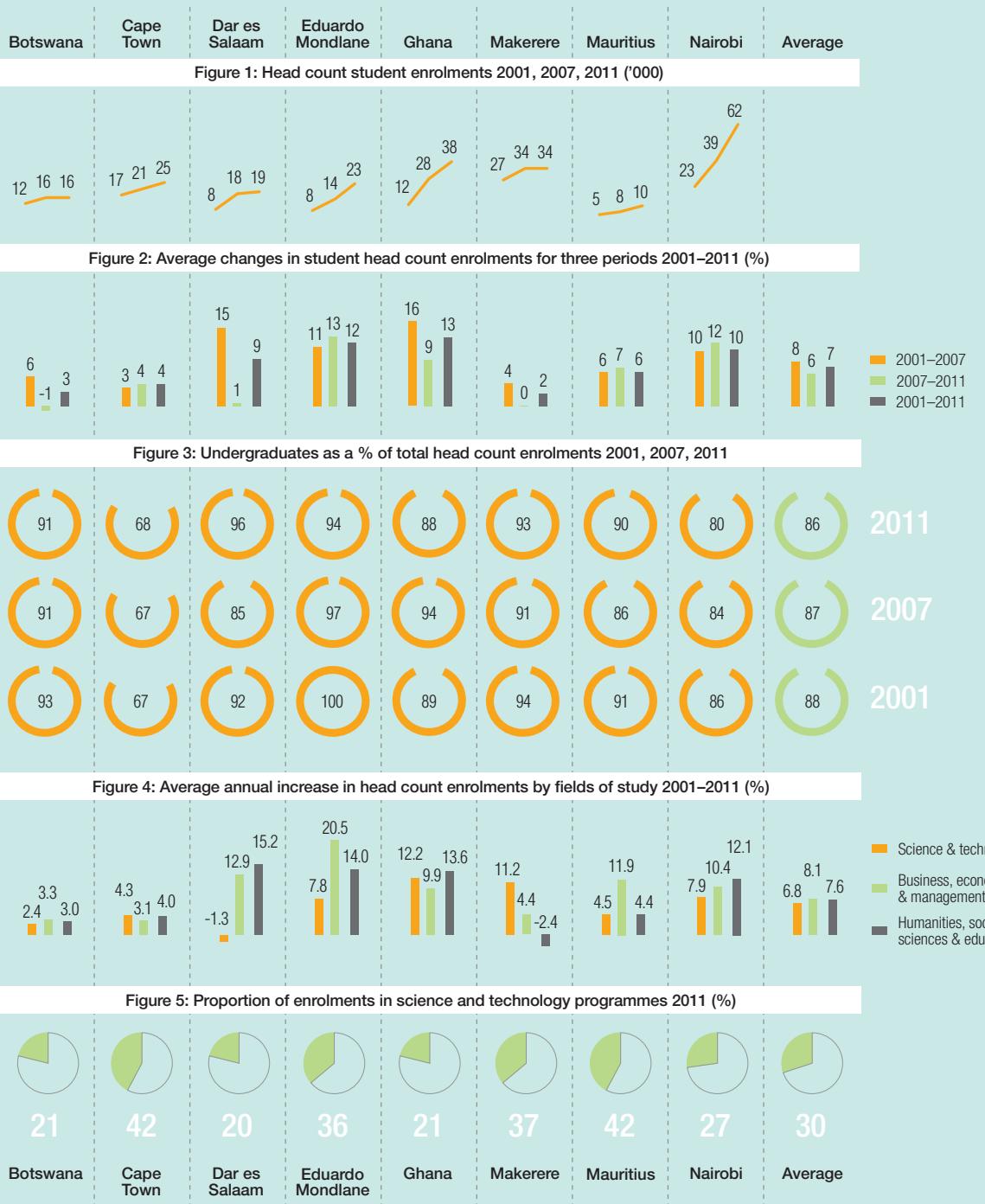
Figure 3 shows that the flagship universities remained primarily undergraduate institutions, despite the rapid increases that occurred in their student enrolments. Cape Town was the only university which had a postgraduate student proportion of above 30% in 2011.

Figure 4 compares average annual growth rates in three broad fields of study. The fields are: (1) science and technology: agriculture, building sciences, computer and mathematical sciences, engineering, health sciences, life and physical sciences; (2) business, economics and management: accounting, auditing, economics, finance, business administration, and various management programmes; and (3) humanities, social sciences and education: fine arts, music and drama, communication studies, languages and literature, public administration psychology, sociology and anthropology, history, political sciences, philosophy and religious studies, studies in school and post-school education, and the training of teachers at all levels.

Figure 4 shows that the largest average annual growth in these flagship universities, taken as a whole, occurred in the broad field of business, economics and management. The flagships' total enrolments in this broad field grew from 22 000 in 2001 to 48 000 in 2011; an average annual growth rate of 8.1%. The flagship universities' total head count enrolments in science and technology programmes grew from 36 000 in 2001 to 69 000 in 2011; an average annual rate of 6.8%.

One important effect of the different growth rates recorded in Figure 4 is that the flagship universities' overall proportion of enrolments in the field of science and technology fell from 32% in 2001 and 2007, to 30% in 2011. In 2001 four of the eight universities reported proportions of science and technology students above 40%, which the HERANA project has regarded as an appropriate development-related target. In 2011 only Mauritius and Cape Town had science and technology proportions above 40%. Figure 5 offers a summary of these changes.

Total Student Enrolments



Student enrolments by gender

Figures 6, 7 and 8 show proportions of female students enrolled in 2011 at the eight universities.

Figure 6 gives a breakdown for all students at undergraduate level and postgraduate below masters level, and shows that only three had proportions of female students above 50%. Dar es Salaam, Nairobi and Eduardo Mondlane had total proportions of female students in this category below 40% 2011. Ghana's proportion of female students in the category fell to 39% in 2011.

Figure 7 summarises the gender breakdown of masters enrolments. The overall 2011 average for the eight universities of female masters student enrolments was 41%, which matched the average proportion of female students in the undergraduate and postgraduate below masters category. Botswana was the only university to reflect a proportion of 50% or above in this time series. A difference between undergraduate and masters proportions worth noting is that of Eduardo Mondlane: in 2011 female students had a 32% share of this university's undergraduate enrolment, but had a 42% share of masters enrolments. The data in Figure 7 show that in 2011 five universities, including Botswana at 52%, had proportions of 40% and above for female masters enrolments.

Figure 8 shows that the proportions of female students in doctoral programmes were low. Only Cape Town (at 45%) had a female doctoral student enrolment above 40% in 2011. Three universities, Botswana, Mauritius and Nairobi had proportions of female doctoral students in the range 30% to 39% in 2011. The remaining four had female doctoral student proportions below 30%.

Masters and doctoral enrolments

Total masters student enrolments at the eight flagship universities grew rapidly over the eleven-year period 2001 to 2011: from 9 625 in 2001 to 25 652 in 2011, an average annual growth rate of 10%.

Figure 9 summarises the masters enrolment totals of the eight universities. The details in the graph show that major shifts occurred between 2007 and 2011 in the masters enrolments of most of the universities. The masters enrolment total for the eight universities increased by almost 10 000 (or 64%) in 2011 compared to 2007.

A number of specific changes reflected in Figure 9 are worth noting:

- Nairobi's masters total grew from 6 145 in 2007 to 11 807 in 2011; an increase of 5 662 (or 92%) over the 5-year period.
- Ghana's masters total grew from 1 503 in 2007 to 4 280 in 2011; an increase of 2 777 (or 185%) over the 5-year period.
- Eduardo Mondlane's masters total grew from 420 in 2007 to 1 295 in 2011; an increase of 875 (or 208%) over the 5-year period.

- Dar es Salaam's masters total fell from 2 165 in 2007 to 522 in 2011; a drop of 1 643 (or 76%) over the 5-year period.

Figure 10 uses the broad fields of study categories defined earlier to provide further information on masters enrolments in 2011.

The totals and proportions reflected in the graph shows that the largest masters student category in 2011, across the eight flagship universities, was business, economics and management, which enrolled almost 10 000 (or 39%) of the overall total of close to 25 700 masters students. Three universities (Nairobi, Dar es Salaam and Mauritius) had more than 50% of their masters enrolments in the field of business, economics and management.

In contrast to business, economics and management masters enrolments, the 2011 science and technology masters total in the eight universities was only slightly more than 8 200 (or 32% of the overall total). Only two universities, Cape Town and Makerere, had more than 50% of their masters enrolments in the broad field of science and technology. Four universities had less than 30% of their masters as well as overall enrolments in science and technology programmes in 2011: Botswana had 25% of masters and 21% of total student enrolments in science and technology programmes, Nairobi had 24% of masters and 27% of total enrolments, Dar es Salaam had 24% of masters and 20% of total enrolments, and Ghana had 22% of masters and 21% of total student enrolments in the science and technology field.

Figure 11 summarises total doctoral student enrolments for the eight flagship universities. In 2001 the total doctoral student enrolment of the eight universities was 1 165, with 706 (or 61%) of these students being enrolled by Cape Town, and in 2007 it was 1 633, with Cape Town retaining its 61% share of the total. The graph shows that doctoral enrolments at Makerere, Ghana and Nairobi increased sharply between 2007 and 2011. In 2007 their combined doctoral enrolment total was 204 and in 2011 it was 1 134, an increase of 930. Because Cape Town's doctoral student enrolment increased by only 224 in 2011 compared to 2007, its share of the total doctoral enrolment of the eight universities fell to 47% in 2011. Mauritius' sharp drop from 193 in 2007 to 49 in 2011 resulted from a change in the registration procedure.

Figure 12 uses the broad fields of study categories to give further details of doctoral enrolments in 2011.

In 2011, 59% of the overall total of doctoral students at the eight universities were enrolled in science and technology programmes, 36% were enrolled in programmes in the broad field of humanities, social science and education, and only 5% were enrolled in programmes in business, economics and management. The two dominant universities in science and technology doctoral programmes in 2011 were Cape Town and Makerere. These two universities had a 76% share of the total science and technology doctoral students enrolled by the eight flagship universities in 2011. Their own

proportions of science and technology doctoral students were high at above 60% of their total doctoral enrolments in 2011.

Figure 13 shows the relationship between masters and doctoral enrolments in two broad fields of study in 2011. The ratios from the data are important indicators of potential flow-throughs of students from masters to doctoral programmes. A target ratio used in early CHET analyses was at most four masters enrolments per doctoral enrolment, which does indicate that masters programmes are not intended to be ‘capping’ qualifications which terminate a student’s involvement in a field of study.

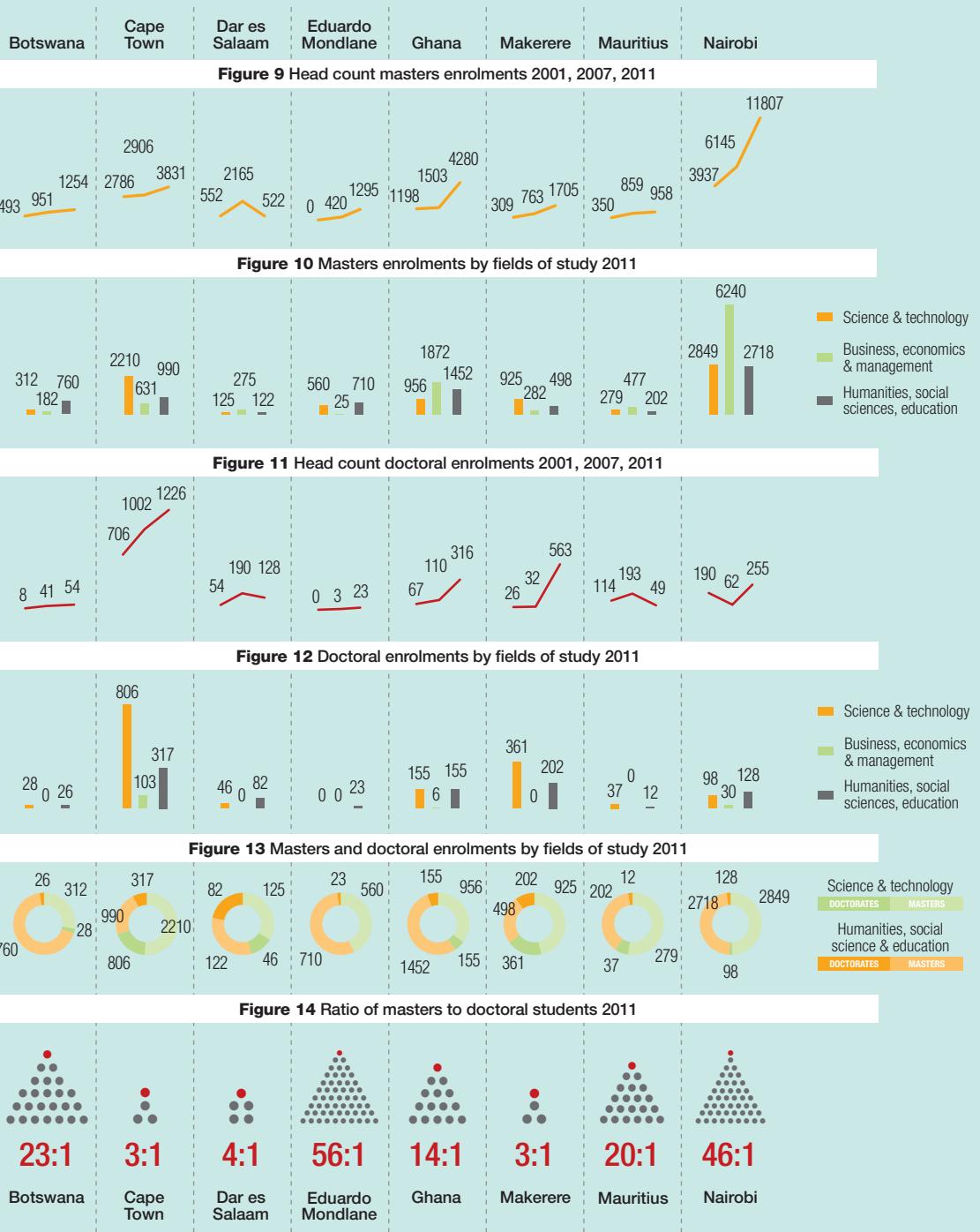
Figure 14 summarises the 2011 ratios between masters and doctoral enrolments. The ratios for Cape Town, Makerere and Dar es Salaam satisfy the original HERANA target of four masters per doctoral enrolment. The ratios for Botswana and Nairobi are high and suggest that even in the fields of science and technology and in humanities, social science and education, masters programmes function as capping qualifications, with few students moving on to doctoral studies.

2011 Female Student Enrolments

Figure 6
Undergraduate

	Botswana	Cape Town	Dar es Salaam	Eduardo Mondlane	Ghana	Makerere	Mauritius	Nairobi	Average	50%
Figure 6 Undergraduate	56	53	39	32	39	44	56	38	41	50%
Figure 7 Masters	52	46	37	42	37	42	49	39	41	50%
Figure 8 Doctorates	39	45	28	22	27	28	39	30	37	50%

Masters & Doctoral Enrolments



3 Academic staff

Summary

- Permanent academic staff totals at the eight flagship universities grew from 5 543 in 2001 to 7 972 in 2011; an average annual growth rate of 4% over the eleven-year period. This was lower than the average annual growth of 7% that occurred in student enrolments.
- Ghana's average annual growth rate in academic staffing was 8% lower than its growth rate in student enrolments, and Nairobi's was 5% lower. Only three universities, Dar es Salaam, Cape Town and Makerere, were able to keep the average gaps between their enrolment and academic staffing growth rates at no higher than 1%.
- Because of the rapid growth in student enrolments, academic work loads as measured by full-time equivalent (FTE) student to FTE academic staff ratios increased over the period 2001 to 2011: Nairobi and Ghana had particularly unfavourable FTE student to FTE academic staff ratios by 2011. Makerere had unfavourable ratios throughout this period.
- The proportions of female staff in the permanent academic staff complements were low in all eight universities. In 2011, two had ratios of female to total permanent academics of 44% and 42%, one had a ratio of 33%, and the remaining five had ratios below 30%.
- The qualifications and ranks held by the permanent academic staff suggest that finding suitable leaders for research groupings could be an issue for most of the eight universities. The proportions of permanent academics with doctoral degrees was below 50% in five universities in 2011, with the exceptions being Botswana, Cape Town and Ghana.
- In 2011, seven of the universities had proportions of full professors plus associate professors below 25%, and proportions of junior academic staff above 50%. Cape Town was the only university which had a high proportion of permanent academics with doctoral degrees (63%) and a high proportion of senior staff at full professor or associate professor levels (40%) in 2011.

Staffing definitions

A staff member is defined as a person who is on the payroll of a university, in either a full-time or part-time capacity. The data system employed by CHET allows the distinction between permanent and temporary staff to be made in one of the following two ways:

1. A staff member can be classified as permanent if she/he contributes to an approved retirement fund of the university, and as temporary if she/he does not.
2. A staff member can be classified as permanent if she/he holds a full-time contract of more than three years, and as temporary if she/he does not have such a contract.

The staff employed by universities are placed into three broad categories by CHET:

1. An academic staff member is an employee who spends at least 50% of her/his official time on duty (i) on research activities and/or (ii) on instruction activities such as lecturing, conducting tutorials or practical sessions, marking assignments or examinations, preparing new curricula.
2. A service staff member is an employee whose duties involve unskilled activities such as cleaning of buildings, gardening, preparing food, serving food, etc.
3. An administrative staff member is a non-academic staff member who functions at levels above that of service staff. This category will include the executive management of the university, deans of faculties (if they spend less than 50% of their official time on teaching and/or research), heads of administrative sections, and other administrative staff such as technicians, librarians, computer staff, accountants and office staff.

A further important staff classification element is that of a full-time equivalent (FTE) staff member. An FTE employee is defined as a staff member who works at the university on a full-time basis for the twelve months of the reporting year. So a staff member who is classified as 'full-time' and who appears on the payroll of the university for twelve months must always equal 1.0 FTE employees. A staff member who works full-time for six months would be counted as 0.5 FTE staff members, and one who works part-time on a one-third contract for twelve months would equal 0.33 FTE staff members.

The analyses which follow focus only on academic staff data because academic staff together with student enrolments are the main direct inputs into the knowledge production activities of the eight flagship universities. The academic staffing resources of a university must be related to the number of students it is expected to teach, as well as to the graduates it produces.

Academic staff totals

Figure 15 summarises, for the period 2001 to 2011, the permanent academic staff totals of the eight flagship universities. These universities' permanent academic staff total increased from 5 543 in 2001 to 7 972 in 2011; an overall increase of 2 429 (or 44%) over the 11-year period.

Eduardo Mondlane and Dar es Salaam had the largest growth in permanent academic staff over this period. Eduardo Mondlane's total grew from 514 in 2001 to 1 333 in 2011 (an average annual increase of 10%), and Dar es Salaam's from 412 in 2001 to 906 in 2011 (an average annual increase of 8%). Nairobi, Makerere and Botswana recorded at 1% the lowest average annual growth rates in permanent academics between 2001 and 2011.

Figure 16 compares average annual growth rates in head count student enrolments and permanent academics employed. The graph shows that total permanent academic staffing in the eight flagship universities grew, between 2001 and 2011, at an average annual rate of 4% compared to an average annual growth of 7% in student enrolments. The biggest differences between student enrolment and academic staffing growth rates occurred in Ghana and Nairobi. Ghana's average annual growth rate in academic staffing was 8% lower than its growth rate in student enrolments, and Nairobi's growth in academic staffing was 5% lower than its growth rate in student enrolments. Three of the other six universities, Dar es Salaam, Cape Town and Makerere, were able to keep the gap between their student enrolment and academic staffing growth rates at 1%, which should have enabled them to maintain acceptable levels of student to academic staff ratios. The gap between the average annual growth rates in students and staff at Eduardo Mondlane, Mauritius and Botswana was 2% which, as the analyses of Figure 17 will show, was wide enough to place pressure on their student to academic staff ratios.

The ratios in Figure 17 are based on full-time equivalent (FTE) academic and FTE student totals. The FTE value given to an academic staff member depends, as is indicated above, on whether the appointment is full-time or part-time and on the period for which she/he is on the payroll. A university's FTE academic staff totals should include, not only all its permanent academics, but also its part-time lecturing staff, as well as its part-time teaching assistants and tutors. FTE student totals are normally lower than head count student totals because they take account of the course loads carried by students. For example, a student who is carrying all the courses required by a standard full-time curriculum would have an FTE value = 1.0. A student carrying 50% of a standard full-time load would = 0.5 FTE students, and one carrying a standard load plus additional courses equivalent to 25% of the standard curriculum would = 1.25 FTE students.

The ratios in Figure 17 reflect in a different way the rates of increase that occurred between 2001 and 2011 in student enrolments and academic staff employed. These ratios can be used as measures of the workloads carried by a

university's academic staff. For example, in South Africa, a ratio of 30:1 would be considered to be an appropriate overall workload target for a university of technology, which is an institution offering primarily vocational programmes at an undergraduate diploma and certificate level. A ratio of 16:1 would be considered to be the maximum appropriate ratio for a university which offers large numbers of undergraduate as well as postgraduate degree programmes in science and technology.

Figure 17 illustrates starkly the effects which rapid enrolment growth plus low academic staff growth must have had on average academic workloads in Ghana and Nairobi. Nairobi's average ratio of FTE students to FTE academics trebled from an acceptable 12:1 in 2001 to an exceptionally high 36:1 in 2011. Ghana's ratio rose from 12:1 in 2001 to 29:1 in 2011.

The FTE students to FTE academic staff ratios of four of the eight universities, Eduardo Mondlane, Cape Town, Botswana and Dar es Salaam, fell in a range which indicates that academic workloads were probably not excessive. Those of Mauritius and Makerere, on the other hand, suggested that academic workloads are higher than would normally be expected of a university which wishes to establish a strong research focus.

Permanent academic staff by gender

Figure 18 shows what shares female academics had of the permanent academic staff totals of the eight universities in 2009 and 2011. Data for 2008 and earlier were not available,

It is worth noting that the overall access of females to permanent academic posts was lower than their access to doctoral programmes. Figure 8 showed that the average proportion of female students in doctoral programmes was 37% in 2011. The proportion of female staff in the overall permanent staff total of the eight universities was only 27%. In 2011, only Mauritius at 44% and Cape Town at 42% had female academic staff proportions above 40%. Only Botswana had a proportion of female academic staff members in the range 30% to 39% in 2011. The remaining five had female academic staff proportions below 30%, ranging from 29% for Makerere to 13% for Dar es Salaam.

Permanent academic staff by qualification and rank

The next features of the academic staffing at the eight flagship universities which need to be considered are the highest formal qualifications and ranks of permanent academics.

Figure 19 shows what proportions of the permanent academic staff held doctoral degrees in 2011. The focus is on academic staff members with doctoral degrees because they play an essential role in the production of research. Permanent academic staff in this qualification category should be the major

producers of research outputs, and at an input level, the main supervisors of doctoral students.

In its first analyses of academic staff data, HERANA had suggested that the target of academic staff with doctoral qualifications should be at least 50%, given that all eight universities aimed to be active producers of high-level research. The data in Figure 19 show that only three of the eight universities had proportions of 50% or above of permanent academic staff with doctorates. The overall average for the eight universities improved from 40% in 2007 to 43% in 2011. Only Eduardo Mondlane, with 17%, continued to have an average well below 40% in 2011.

In its data analyses CHET has placed permanent academic staff into this seniority hierarchy:

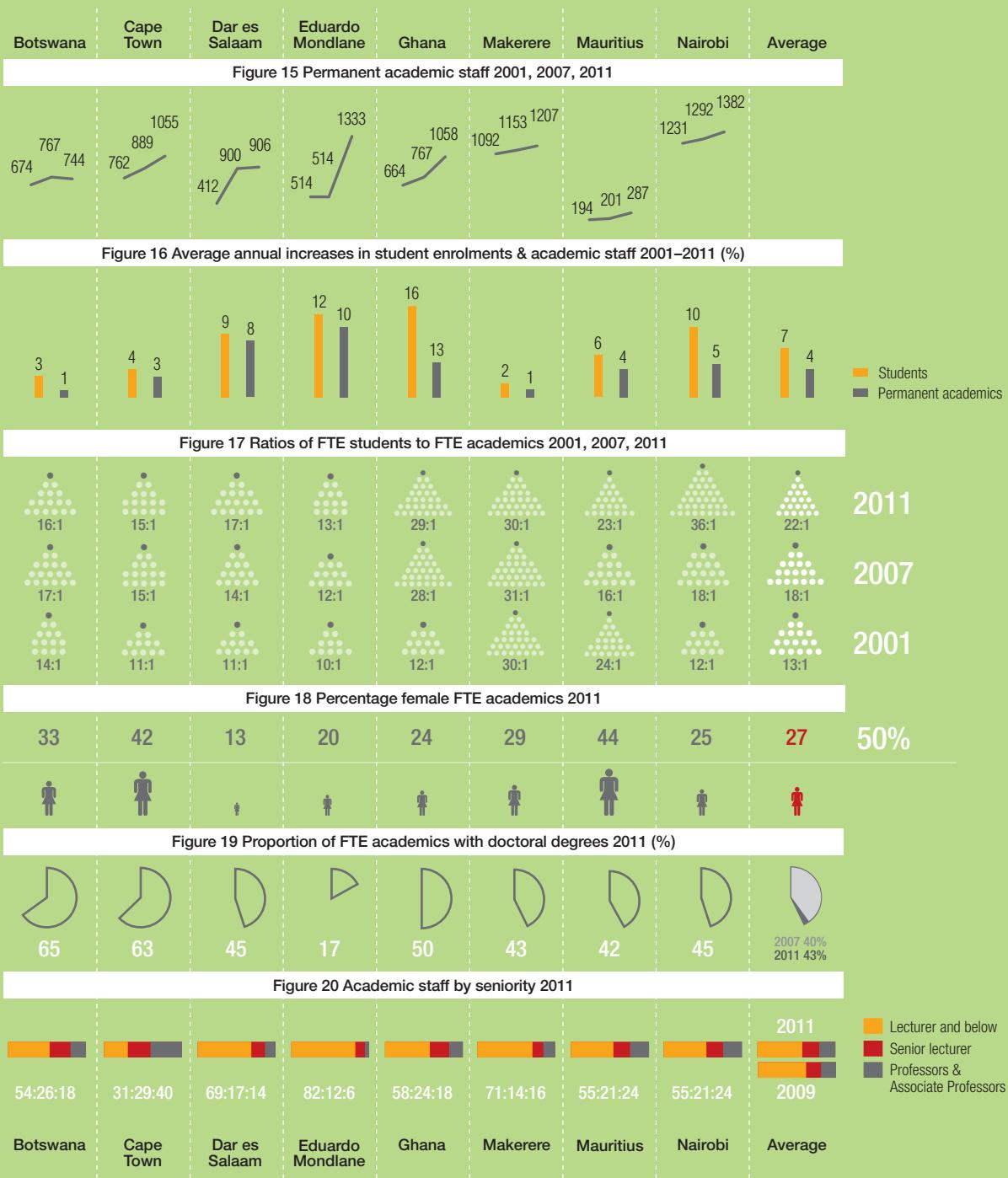
1. professor (sometimes described as ‘full professor’)
2. associate professor
3. senior lecturer
4. lecturer
5. junior lecturer and below.

Figure 20 shows data for 2011 only. The graph takes ‘senior academics’ to be those in the categories of professors and associate professors, and ‘junior academics’ to be those in the categories of lecturer and junior lecturer and below. The senior academics category is important because research leaders, particularly of research groups, should ideally be either professors or associate professors. The junior academics category should give a sense of what proportion of the permanent academic staff of a university may not be sufficiently qualified to become research leaders. Staff from this group would typically be pursuing personal research agendas, such as doctoral programmes, designed to improve qualifications. Senior lecturers are often an ‘intermediate’ grouping, only some of whom could be considered for research leadership positions.

In 2011, 23% of the total permanent academic staff of the eight universities were classified as senior lecturers. The proportions of senior lecturers reported in 2011 by individual universities were: Cape Town 29%, Botswana 26%, Ghana 24%, Mauritius 21%, Nairobi 21%, Dar es Salaam 17%, Makerere 14%, and Eduardo Mondlane 12%.

The data on doctoral qualifications in Figure 19 and on senior academic staff in Figure 20 will be put together in the section on knowledge outputs to give a picture of the input strengths of the universities as far as the production of high-level knowledge is concerned.

Academic Staff



4 Knowledge outputs

Summary

- The combined graduate total of the eight universities doubled over the eleven-year period 2001 to 2011. Ghana and Nairobi recorded the largest total increases in graduates.
- Six of the eight universities had larger average annual increases in graduates than in enrolments, which is an indication of improvements in output efficiencies.
- The masters graduate total of the eight universities increased from 2 268 in 2001 to 7 156 in 2011. Nairobi and Ghana had the largest increases in masters graduates. Nairobi's masters graduate total increased six-fold from 370 in 2001 to 2 533 in 2011, and Ghana's total almost trebled from 541 in 2001 to 1 591 in 2011.
- The combined doctoral graduate total of the eight universities increased from 154 in 2001 to 367 in 2011. Cape Town, Nairobi and Makerere produced 80% of the 2001 doctoral graduate total, 82% of the total in 2007, and 76% in 2011.
- The research article total of the eight universities doubled from 1 148 in 2001 to 2 574 in 2011. Cape Town, Nairobi and Makerere dominated the research article output, producing 80% of the total in 2001 and 81% in 2011.
- The dominant performance of Cape Town, Nairobi and Makerere in terms of both research article output and PhD graduates indicates a positive correlation between doctoral graduates and knowledge production.

Note

- This subsection presents the trends that occurred in knowledge output totals over the eleven-year period 2001 to 2011, without attempting to assess the output performances of the universities. A brief performance assessment of outputs related to academic staff will be offered in the final section of this report.

Graduate totals

Graduates, defined as students who have satisfied all the requirements of a degree or diploma or certificate, are important first measures of the knowledge outputs of universities. Figure 21 shows how the graduate totals (undergraduate as well as postgraduate qualifications) of the eight universities changed between 2001 and 2011. The graduate total of the eight universities doubled from 22 000 in 2001 to 45 100 in 2011. The largest increases between 2001 and 2011 were recorded by Nairobi which increased its graduate total by 7 000 from 3 400 in 2001 to 10 400 in 2011, and Ghana which increased its total by 5 500 from 2 500 in 2001 to 8 000 in 2011.

Table 3 compares the average annual growth rates in head count enrolments and graduates over the period 2001 to 2011. These growth rates can be used as broad measures of output efficiency. A university, even if it is experiencing rapid increases in enrolments, should have similar values for its average enrolment and graduate growth rates. The table shows that only two of the eight universities had graduate growth rates lower than those of enrolments. These were Ghana whose graduate growth was 1% lower than its enrolment rate, and Botswana which had a gap of 5%. In Botswana's case, its graduate total of 2 500 in 2011 was lower than its 2001 total of 3 200 and its 2007 total of 3 600.

Table 3: Comparison of average annual growth rates in total enrolments & graduates 2001–2011

	HEAD COUNT ENROLMENTS	GRADUATES
Botswana	3%	-2%
Cape Town	4%	5%
Dar es Salaam	9%	11%
Eduardo Mondlane	12%	13%
Ghana	13%	12%
Makerere	2%	5%
Mauritius	6%	7%
Nairobi	10%	12%
AVERAGE	7%	7%

Figure 22 shows how masters graduate totals increased over the period 2001 to 2011. The masters graduate total of the eight universities increased at an average annual rate of 12% over the period; from 2 268 in 2001 to 7 156 in 2011. Two universities were responsible for 66% of the overall increase of 4 888 in 2011 compared to 2001. They were Nairobi, whose masters graduate total increased six-fold from 370 in 2001 to 2 533 in 2011, and Ghana whose masters graduate total almost trebled from 541 in 2001 to 1 591 in 2011.

Figure 23 summarises doctoral graduate totals over the period 2001 to 2011. The doctoral graduate total of the eight universities rose from 154 in 2001 to 367 in 2011. Cape Town, Nairobi and Makerere produced 80% of the doctoral graduate total of the eight universities in 2001, 82% of the total in 2007, and 76% in 2011.

Research articles

Three different categories of research publication are recognised in data reported in South Africa's higher education management information system. These are (1) published proceedings of research conferences, (2) research books and (3) articles in research journals. The basic requirement for all three categories is that of peer review and approval by a panel of research specialists before publication.

Because South African universities receive government funding subsidies for research outputs, two further criteria are applied when research article outputs are reported in South Africa. The first is that the article must be published in a journal which appears on the list of research journals compiled and approved by the South African Department of Higher Education and Training. The second requirement is that only one publication unit is allocated to each research article. If the authors of a research article are employed by different universities, then fractions of the unit available are assigned to each of the universities concerned.

In its analyses of research outputs, CHET considered research articles only. This was partly due to the fact that with the exception of the University of Cape Town, universities were not able to provide accurate data on their publication outputs. To count research articles per university, CHET used the ISI's arts and humanities, social science, and science-expanded citation indexes, and extracted from them all research articles that contained at least one author whose address is that of one of the eight flagship universities included in this study. The South African practice of allocating a single unit per research publication is not followed. If the authors of a research publication recorded on a citation index are employed by different universities, then full units were assigned to each of the universities concerned. This implies, in the case of Cape Town, that its research article count could be higher than the count approved for government funding purposes by the national Department of Higher Education and Training.

Figure 24 summarises the research article totals for the eight universities. It shows that the combined output doubled from 1 148 research articles in 2001 to 2 574 in 2011. The graph also shows that the output of research articles was, as in the case of doctoral graduates, dominated by Cape Town, Nairobi and Makerere. These three universities produced 80% of the overall research article total in 2001, and 81% in 2011.

Knowledge Outputs

Botswana Cape Town Dar es Salaam Eduardo Mondlane Ghana Makerere Mauritius Nairobi

Figure 21 Total graduates 2001, 2007, 2011 ('000)



Figure 22 Masters graduates 2001, 2007, 2011



Figure 23 Doctoral graduates 2001, 2007, 2011

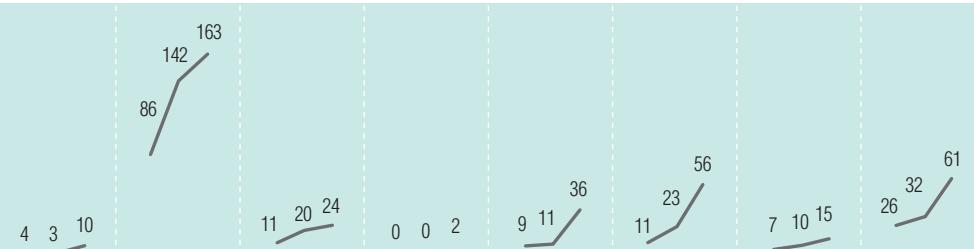


Figure 24 Research articles 2001, 2007, 2011



Relating inputs to outputs

A major aim in CHET's overall analyses of the data of the eight flagship universities has been that of extracting performance indicators, which link together descriptive input and output data of the kind outlined in this report. The final section of this report offers an example of the kind of performance analyses which can be extracted from the data in the report.

5 High-level performance indicators: An example

Summary

- The example begins with the Organisation for Economic Co-operation and Development (OECD) view that the high-level knowledge inputs of universities are doctoral enrolments and academic staff, and that high-level knowledge outputs are doctoral graduates and research articles. The example then considers academic staff only, and defines two sets of ‘high-level’ permanent academic staff inputs: (a) those with doctoral qualifications, and (b) those who hold ranks of (full) professor and associate professor.
- CHET assumes that appropriate input targets for a flagship university are that (1) at least 40% of its permanent academic staff should have doctoral degrees, and (2) that at least 25% of its permanent academic staff should hold the rank of (full) professor or associate professor.
- Diagram 1 shows that only Mauritius and Eduardo Mondlane did *not* meet the target of 40% permanent academics to have doctoral degrees, and that only Cape Town and Nairobi meet the target of 25% of permanent academics to be either professors or associate professors.
- CHET’s output targets are set in terms of ratios of graduate and research publication totals to ‘high-level’ staff. The ratios, for both groups of high-level staff, are 0.15 doctoral graduates and 1.0 research articles.
- Diagram 2 implies that the permanent academics with doctorates, other than those in Cape Town, have under-performed as far as the production of doctoral graduates and research publications are concerned.
- Diagram 3 suggests that professors and associate professors, other than those in Cape Town and Makerere, have also under-performed as far as the production of doctoral graduates and research publications are concerned.

High-level knowledge inputs and outputs

In its analyses of performance indicators, CHET has followed the OECD in taking the primary high-level knowledge inputs of universities to be doctoral enrolments and academic staff, and their high-level knowledge outputs to be

doctoral graduates and research publications. In this section these outputs are linked to the high-level academic staffing inputs of universities, which are taken to be (a) their permanent academic staff with doctoral qualifications, and (b) their senior academic staff who hold ranks of (full) professor or associate professor.

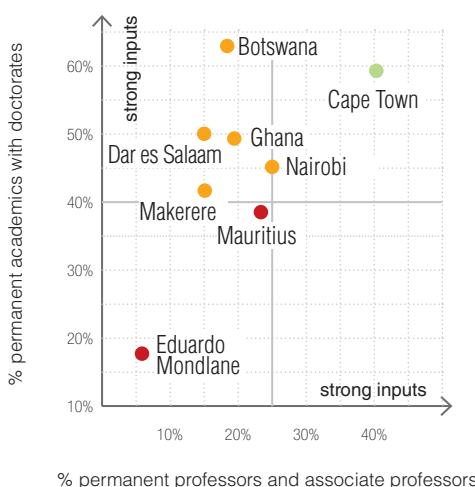
These two sets of permanent academics do not necessarily overlap. Some staff with doctorates may hold ranks of lecturer or senior lecturer, and some professors and associate professors may not have doctoral qualifications. The key issue is that a university's permanent academic staff in groupings (a) and (b) should be its research leaders.

High-level knowledge inputs

Diagram 1 offers a representation of the high-level staffing input strengths of the eight universities, using data averages for the years 2009 to 2011. The picture assumes that appropriate input targets for a flagship university are firstly that at least 40% of its permanent academic staff should have doctoral degrees, and secondly that at least 25% should hold senior ranks of (full) professor or associate professor.

The diagram shows that only Cape Town meets both input targets. Mauritius and Eduardo Mondlane meet neither of the two input targets, and so fall into a weak input quadrant. The remaining five universities are shown as having reasonable proportions of academic staff with doctoral qualifications, but low proportions of senior academics.

Diagram 1: High-level academic staff inputs



High-level knowledge outputs

These academic staff input targets can now be related to the research output targets which CHET will propose for flagship universities. The proposed output targets are:

Target 1: A university's total research outputs should be divided by its total permanent academics with a doctoral qualification, without separating out those outputs which were produced by academic staff without doctorates. The resulting annual high-level knowledge output ratios should be at least 0.15 doctoral graduates and at least 1.0 research articles per permanent academic with a doctoral qualification.

Target 2: A university's total research outputs should be divided by its total permanent senior academics holding ranks of professor and associate professor, without separating out those outputs which were produced by junior academic staff. The resulting annual ratios should be at least 0.15 doctoral graduates and at least 1.0 research articles per permanent professor and associate professor.

Detailed justifications for the use of these targets will be offered in CHET's next report which will develop indicators for the academic core of the eight flagship universities.

Table 4 sets out, for the period 2009 to 2011, the annual average total senior academics and staff with doctorates employed by each of the eight universities. Table 5 sets out, for the same period, their total doctoral graduates and research articles.

Table 4 Average annual totals of permanent academic staff (2009–2011)

	PERMANENT PROFESSORS + ASSOCIATE PROFESSORS	STAFF WITH DOCTORATES
Botswana	122	481
Cape Town	389	587
Dar es Salaam	130	416
Eduardo Mondlane	67	177
Ghana	311	465
Makerere	187	480
Mauritius	65	114
Nairobi	336	615
TOTAL	1 607	3 335

Table 5: Average annual totals of high-level knowledge outputs (2009–2011)

	RESEARCH ARTICLES	DOCTORAL GRADUATES
Botswana	125	8
Cape Town	1 402	163
Dar es Salaam	91	17
Eduardo Mondlane	45	1
Ghana	141	23
Makerere	318	45
Mauritius	47	13
Nairobi	186	41
TOTAL	2 355	311

Tables 6 and 7 were derived by dividing the output totals in Table 5 by the staff category totals in Table 4. These ratios which will be used as a first assessment of the high-level knowledge outputs of the eight flagship universities.

Table 6: Average annual high-level outputs per permanent academic with a doctoral qualification (2009–2011)

	RESEARCH ARTICLES	DOCTORAL GRADUATES
Botswana	0.26	0.02
Cape Town	2.39	0.28
Dar es Salaam	0.22	0.04
Eduardo Mondlane	0.25	0.01
Ghana	0.30	0.05
Makerere	0.66	0.09
Mauritius	0.41	0.11
Nairobi	0.30	0.07
TOTAL	0.73	0.10

Table 7: Average annual high-level outputs per permanent professor and associate professor (2009–2011)

	RESEARCH ARTICLES	DOCTORAL GRADUATES
Botswana	1.02	0.07
Cape Town	3.60	0.42
Dar es Salaam	0.70	0.13
Eduardo Mondlane	0.67	0.01
Ghana	0.45	0.07
Makerere	1.70	0.24
Mauritius	0.72	0.20
Nairobi	0.55	0.12
TOTAL	1.48	0.20

The ratios in Table 6 of high-level knowledge outputs to academic staff with doctoral qualifications is mapped in Diagram 2. The first axis in Diagram 2 gives ratios of research articles to permanent academics with doctorates, and the second provides ratios of doctoral graduates to permanent academics with doctorates. The borders of the quadrants are based on those which are proposed by CHET: 1 research article per academic and 0.15 doctoral graduates per permanent academic with a doctorate.

The diagram shows that only Cape Town met both the research articles target as well as that of doctoral graduates per permanent academic with a doctoral qualification. None of the other seven universities met either of the targets. The main implication of the diagram is that the well-qualified permanent academic staff (those with doctorates) of the seven universities have been under-performing as far as the production of high-level knowledge outputs is concerned.

Diagram 2: Ratios of high-level knowledge outputs to academic staff with doctorates

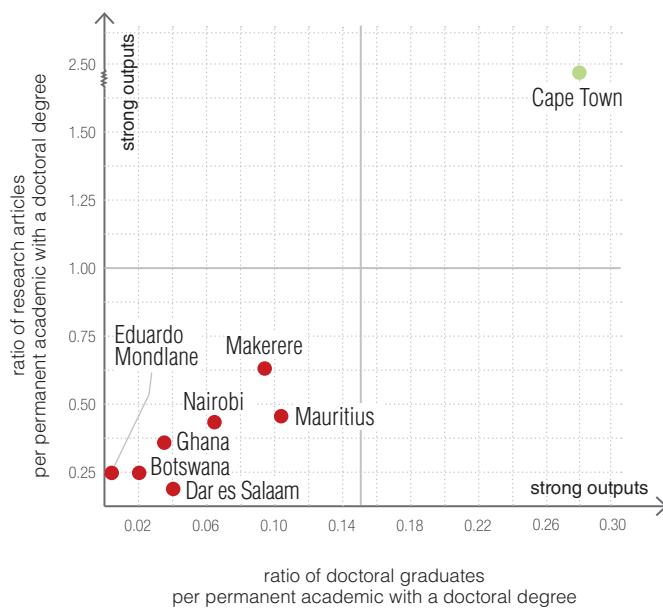
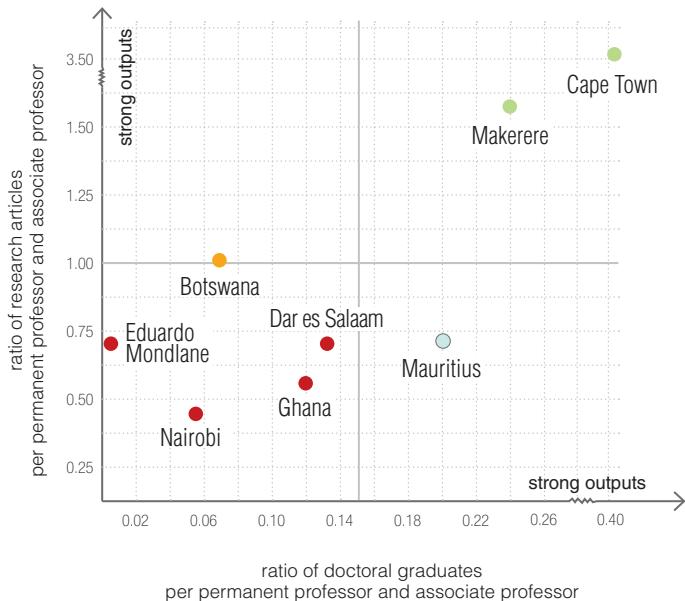


Diagram 3 maps the ratios in Table 7 of high-level knowledge outputs to senior academic staff onto two axes. The first axis gives ratios of research articles to permanent professors and associate professors, and the second details ratios of doctoral graduates to permanent professors and associate professors. The borders of the quadrants are in the same range as those set for Diagram 2: 1 research article per academic and 0.15 doctoral graduates per permanent professor and associate professor.

Diagram 3: Ratios of high-level knowledge outputs to professors and associate professors

The results in Diagram 3 differ in some ways from those in Diagram 2. The most obvious change is that Makerere now meets both targets and so joins Cape Town in the strong output quadrant. Other clear changes are that Botswana moves above the target for research papers per professor and associate professor, and Mauritius moves into a quadrant which records above-target performance with regard to doctoral graduates, but below-target performance in the production of research articles. The other five universities remain in the quadrant which displays low output performance in relation to both output targets.

A main aspect of the picture which emerges from Diagram 3 is that the professors and associate professors in six of the flagship universities are underperforming as far as the production of high-level knowledge is concerned. This could well be a consequence of the low proportions which these universities have of professors and associate professors (see Diagram 1), particularly if they expect staff in these categories to be major leaders of teaching and administrative activities.

6 Some concluding issues

The discussions in the main sections of this paper raised a number of policy and evaluative issues about the functioning of the eight universities during this period of 2001 to 2011. Examples of these issues are set out below.

Satisfying ‘flagship’ goals

This report has indicated that two of the ‘flagship goals’ of each of the eight universities were to:

1. engage in high quality research and scholarship
2. deliver knowledge products which will enhance national and regional development.

Diagrams 1, 2 and 3 in the previous section suggest that Cape Town is the only university in this group of eight which clearly satisfies these two goals. Makerere comes closest to Cape Town on the indicators which judges the performance of research leaders in the form of professors and associate professors.

The two main problems which the seven universities outside South Africa face in their attempts to achieve these goals are:

1. They enrol, relative to their undergraduate student bodies, low proportions of postgraduate students at masters and doctoral levels. Furthermore, their masters programmes seem to be focused on professional, capping degrees, rather than on degrees which offer training in high-level research. This results in low numbers of masters graduates moving on to doctoral studies.
2. The staff complements of these seven universities consist of high proportions of junior, under-qualified academics, leaving available low numbers of potential research leaders. Research leaders should ideally have doctoral qualifications and hold ranks of professor or associate professor.

These broad conclusions will be analysed further as CHET moves on to develop and assess the academic core of each of the eight flagship universities. These academic core consists of (a) the inputs which the university needs

to deliver its teaching and research activities, (b) the actual outputs of these activities, and (c) the performance targets linked to the inputs and outputs. Having now received all the required data, CHET has been able to begin its analyses of the academic core of the eight universities.

Student enrolment planning

The analyses of student enrolments in this report shows that total student enrolments at the eight flagship universities doubled between 2001 and 2011. The growth rates of individual universities did, however, differ widely; ranging from high average annual growth rates of 13% for Ghana, 12% for Eduardo Mondlane and 10% for Nairobi, to more moderate growth rates of 4% for Cape Town, 3% for Botswana and 2% for Makerere.

The analyses showed further that enrolment growth rates across different fields of study and different qualification levels were uneven. This had an impact, for example, on science and technology programmes whose share of the total enrolment of the eight universities fell from 32% in 2001 to 30% in 2011. Another effect was that, by 2011, the share which science and technology had of total masters enrolments (32%) dropped well below that of business, economics and management (39%).

It is not clear whether the changes that occurred in enrolments over the period were the result of planned or unplanned responses to student access pressures. It is also not clear whether these universities had student enrolment plans in place.

A student enrolment plan would normally be used as a basis for managing and monitoring by qualifications and fields of study (a) the flow of new students into a university, (b) the registration of returning students, (c) the progress of students across academic years, and (d) the exiting of students from the university as either drop-outs or graduates. A central aspect of the plan would be an account of the physical and staffing resource requirements of the admissions and enrolment processes.

The staffing data presented in this report suggest that enrolment plans may not be in place in those universities which experienced high enrolment growth rates and low increases in academic staffing, or which experienced major shifts in the fields of study followed by students. It is also not clear whether specific targets have been set for the recruitment of masters and doctoral students, or whether postgraduate enrolment patterns are simply functions of the choices made by individual students.

The new data which CHET has collected should enable universities to do the essential preliminary analyses for student enrolment planning. CHET has offered to undertake a number of planning case studies together with universities which do not have plans in place.

Research incentives and management

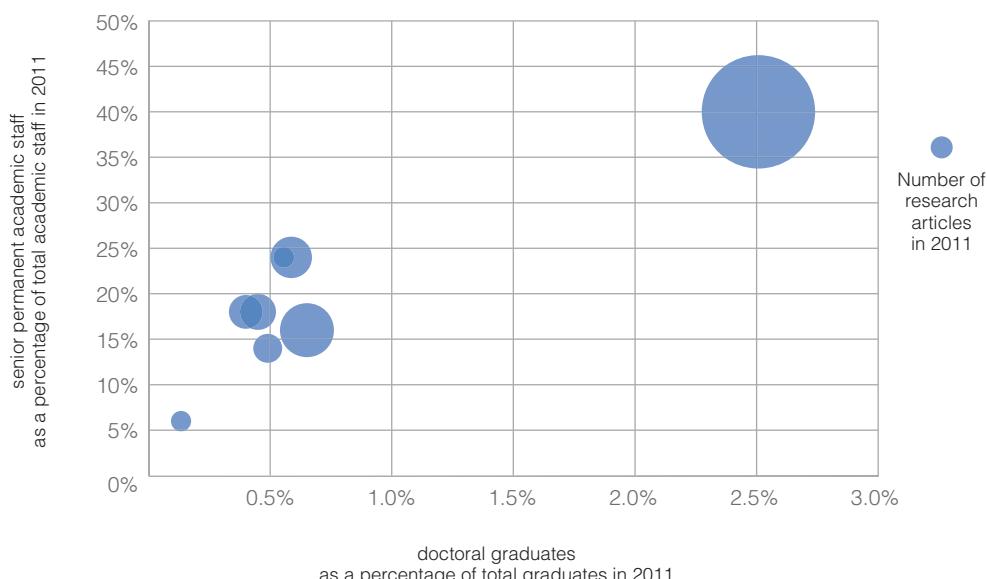
The data in this report showed that six of the eight universities had academic staff with doctoral qualification proportions above 40%. The data also suggested that six of the eight universities had low proportions of below 25% of senior academics at professor and associate professor level. Their high proportions of staff without doctorates and of junior academics would clearly have had a negative effect on the high-level knowledge outputs of these universities.

Diagram 4 shows how a low percentage of senior academic staff (y-axis) combined with a low percentage of doctoral graduates (x-axis) correlates with low knowledge output in the form of research articles (represented by the blue spheres in the graph).

The analyses in the previous section showed, however, that the groups of staff who would be expected to be active in research (those with doctorates

Diagram 4: Senior academic staff and doctoral graduates as predictors of publication output

University	2011		
	Doctoral graduates as % of total graduates	Senior academic staff as % of total staff	Research articles
Botswana	0.40%	18%	125
Cape Town	2.51%	40%	1 402
Dar es Salaam	0.49%	14%	91
Eduardo Mondlane	0.13%	6%	45
Ghana	0.45%	18%	141
Makerere	0.65%	16%	318
Mauritius	0.56%	24%	47
Nairobi	0.59%	24%	186



and those at senior levels) were generally unproductive as far as high-level knowledge outputs were concerned. This raises the issues of whether the universities have structures in place for the management of research, and if they have been able to introduce incentives designed to improve the research activities of academic staff members.

A lack of incentives (such as research funding or promotion prospects) may be affecting the output of staff who have doctorates but who are at levels of senior lecturer and below. Their administrative and teaching workloads, plus the lack of research funding, may be the causes of the low productivity of senior academics at six of the eight universities. This is an area requiring further research.

Issues related to incentives are being explored by CHET in a related HERANA project. CHET has also completed a group of South African case studies on roles played by research management structures and staff incentives in the production of high-level research.

Post-script

HERANA 3: From flagship to research universities

In HERANA 2 we have used the term ‘flagship’ but increasingly the international discourse is about research universities. A research university can be described as an academic institution committed to the creation and dissemination of knowledge, in a range of disciplines and fields, and featuring the appropriate laboratories, libraries and other infrastructure that permit teaching and research at the highest possible level. Worldwide, research universities play complex roles in the academic system, including the core mission of research production and the training of students to engage in research. The research university is not an ivory tower and is relevant to the wider community; much of its research is carried out in collaboration with funding and sponsorship from non-university sources. The research university is a highly complex and multifaceted institution serving many societal roles. Research universities worldwide have a great deal in common, stemming from a specific tradition and from serving similar roles.

Research universities in low- and middle-income countries have a crucial role to play in developing differentiated and effective academic systems, and in making it possible for their countries to join the global knowledge society and to compete in sophisticated knowledge economies. While research universities in the developing world have not yet ascended to the top levels of the global rankings, they are important in their countries and regions – and are steadily improving their reputations and competitiveness on the international stage. A key point is that research universities around the world are part of an active community of institutions that share values, foci and missions.

The above description is very similar to our previous use of the term flagship. But for HERANA 3 we think it could be more practical to use the term ‘research university’.

In the preceding section we started identifying institutional factors that affect research output – doctoral graduates, availability of senior staff and research publications. For HERANA 3 we want, building on the HERANA 2 project, to institutionalise data collection and analysis to inform institutional reform strategies that will contribute to building a group of strong research universities in Africa.

Nico Cloete
Director: CHET

Definitions

Academic staff member: An academic staff member is an employee who spends at least 50% of her/his official time on duty (i) on research activities and/or (ii) on instruction activities such as lecturing, conducting tutorials or practical sessions, marking assignments or examinations, preparing new curricula.

Full-time equivalent (FTE) staff: An FTE employee is defined as a staff member who works at the university on a full-time basis for the twelve months of the reporting year. So a staff member who is classified as 'full-time' and who appears on the payroll of the university for 12 months must always equal 1.0 FTE employees. A staff member who works full-time for six months would be counted as 0.5 FTE staff members, and one who works part-time on a one-third contract for 12 months would equal 0.33 FTE staff members.

Full-time equivalent (FTE) enrolments: An FTE student enrolment total takes into account the courseload carried by a student. This can be illustrated in the following examples: (1) If year one of a Bachelor of Arts programme requires registration for four courses, a student enrolling for the full curriculum would be counted as a single FTE unit; (2) a part-time student who is registered for one third of a standard curriculum would be counted as 0.33 of an FTE enrolment. A student registering for only 50% of the required courses for a year of a particular qualification would be regarded as 0.5 of an FTE enrolment.

Head count enrolments: A head count enrolment total is literally a counting of heads, which implies that both full- and part-time students are considered as single units, irrespective of the course load each is taking.

Research publications: In its analyses of research outputs, CHET considered research articles only. It used the ISI's arts and humanities, social science, and science-expanded citation indexes, and extracted from them all research articles which contain at least one author whose address is that of one of the eight flagship universities included in this study. If the authors of a research publication recorded on a citation index are employed by different universities, then full units were assigned to each of the universities concerned.

An Empirical Overview of Eight Flagship Universities in Africa 2001–2011 is the second publication in which the Centre for Higher Education Transformation's Higher Education Research and Advocacy Network in Africa (HERANA) project reports on the collecting and analysis of cross-national higher education data for a group of eight 'flagship' universities in Africa. These eight universities are described as flagship universities because each is the most prominent public university in its country, and because all of the universities have broad flagship goals built into their vision and mission statements. The report consists primarily of descriptive analyses of the student enrolments, academic staff profiles and knowledge outputs of the eight universities. It concludes with an analysis of performance which focuses on the links between high-level academic staffing resources and high-level knowledge outputs.

 African Higher Education
OPEN DATA

All data published in this report is available on the CHET website:
www.chet.org.za/data

Data can be downloaded free of charge and may be re-used subject only to the acknowledgement of CHET as the source of the data.

