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Knowledge Production and Contradictory Functions in African Higher Education

Edited by Nico Cloete, Peter Maassen and Tracy Bailey

AFRICAN MINDS

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ACRONYMS AND ABBREVIATIONS

AOSTI	African Observatory of Science, Technology and Innovation
BRICS	Brazil, Russia, India, China and South Africa
B-TEC	Botswana Tertiary Education Council
CHET	Centre for Higher Education Transformation
COSTECH	Commission for Science and Technology (Tanzania)
CREST	Centre for Research on Evaluation, Science and Technology
CSHE	Centre for Studies in Higher Education (University of California, Berkeley)
CSIR	Council for Scientific and Industrial Research (Ghana)
DFID	Department for International Development (United Kingdom)
DHET	Department of Higher Education and Training (South Africa)
DST	Department of Science and Technology (South Africa)
FIRCA	Inter-professional Fund for Agricultural Research and Council (Côte d'Ivoire)
FONRID	National Fund for Research and Innovation for Development (Burkina Faso)
FTE	full-time equivalent
GDP	gross domestic product
GERD	gross domestic expenditure on research and development
G-NCTE	Ghana National Council for Tertiary Education
HEMIS	higher education management information system
HERANA	Higher Education Research and Advocacy Network in Africa
IAU	International Association of Universities
ISI	Institute for Scientific Information
K-CHE	Kenya Commission for Higher Education
MAK	Makerere University (Uganda)
M-CNAQ	Mozambique National Council for Quality Assurance
M-TEC	Mauritius Tertiary Education Commission
NCHE	National Commission on Higher Education
NDP	National Development Plan
NEPAD	New Partnership for Africa's Development
NMMU	Nelson Mandela Metropolitan University (South Africa)

NRF	National Research Foundation (South Africa)
NSTC	National Science and Technology Council (Zambia)
OECD	Organisation for Economic Co-operation and Development
PANGeA	Partnership for Africa's Next Generation of Academics
R&D	research and development
RCZ	Research Council of Zimbabwe
S&T	science and technology
SA-Africans	South African Africans
SA-CHE	South African Council on Higher Education
SADC	South African Development Community
SARUA	Southern African Regional Universities Association
SERU	Student Experience in the Research University (survey)
SET	science, engineering and technology
SGC	science granting council
STEM	science, technology, engineering and mathematics
STI	science, technology and innovation
TCU	Tanzania Commission for Universities
TE/HE	tertiary or higher education
TEMIS	tertiary education management information system
UCT	University of Cape Town (South Africa)
U-NCHE	Uganda National Council for Higher Education
UNCST	Uganda National Council for Science and Technology
UNESCO	United Nations Educational, Scientific and Cultural Organization
UoN	University of Nairobi (Kenya)
USD	United States dollars
WoS	Web of Science

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FOREWORD

Currently, Africa has more than half of the 20 fastest-growing economies in the world, which has contributed to what has been called the era of 'Africa Rising' or a 'New Africa'. In order to further strengthen socio-economic development, African universities need to improve their ability to produce and apply knowledge in effective and relevant ways. In OECD countries there are several public and private sites for knowledge production, but in Africa the university is the only knowledge institution, and hardly any knowledge is produced outside of the university. However, the performance of African universities in knowledge production has not been impressive. It has generally been acknowledged by agencies such as the African Observatory for Science, Technology and Innovation and the World Bank, as well as leading development scholars, that African universities are lagging behind the rest of the world in their knowledge production function. There has been only weak empirical evidence on the actual performance of universities, with virtually no cross-institutional and cross-country comparative research on the factors that are responsible for the poor performance of universities in knowledge production across the continent.

The crossroads African universities are facing consist of, on the one hand, a familiar path of relative decoupling between the university and its nation's socio-economic development and, on the other hand, a path that requires far-reaching changes that could make it possible for the African university to connect much more productively to the main actors in emerging national (and in some cases regional) development and innovation networks. For the latter path to become accessible, these universities and their national authorities need research-rooted information.

In order to address this need, the Higher Education Research and Advocacy Network in Africa (HERANA) project was initiated by the Centre for Higher Education Transformation (CHET) in 2007. Its main aim has been to investigate the relationship between higher education and development – economic and democratic – in Africa. The HERANA project, funded mainly by the Carnegie Corporation of New York and the Ford Foundation, comprises a network of about 50 academics and practitioners from around the globe. The project has conducted several rounds of theory-driven empirical studies that involved the flagship universities in eight sub-Saharan African countries: the University of Botswana, the University of Cape Town (South Africa), the University of Dar es Salaam (Tanzania), Eduardo Mondlane

University (Mozambique), the University of Ghana, the University of Mauritius, Makerere University (Uganda), and the University of Nairobi (Kenya). The main underlying aim of the HERANA project is to contribute to a better understanding of the factors that influence the performance dynamics of African universities, especially when it comes to the role of these universities in knowledge production and their relationships to development.

The second phase of the project was launched towards the end of 2011.[1] In HERANA Phase 2, the project maintains its focus on Africa; eschews common assumptions about African universities (poor funding, low quality or lack of research infrastructure, lack of qualified staff, etc.); and persists with its strategy of scientific based advocacy. But while the lens is turned to Africa, the project speaks, as Sir Peter Scott suggests, to the current and future state of higher education globally.

The first section of Chapter 1 highlights that the project was grounded in seminars, discussions and book projects with prominent African (and global) intellectuals such as Mahmood Mamdani and Kwame Appiah, and with international higher education studies scholars such as Sir Peter Scott and Frans van Vught. Of particular importance for this volume was the influence of the series of seminars with Manuel Castells and his thesis on the contradictory functions of contemporary universities. While each of the HERANA Phase 2 research projects was conducted independently under the broader framework developed in Phase 1, this book refracts the findings and implications of each study to assess Castells' proposed functions, particularly in terms of what is revealed about how Africa's flagship universities are able to transform themselves into research-intensive institutions.

By mining the full breadth of its research activities, which include core themes such as information capacity-building for evidence-based planning, knowledge production indicators, incentives in African universities, the governance role of higher education and research councils, as well as community and student engagement, HERANA Phase 2 provided an empirical vantage point from which to examine contemporary theories on the role of universities in development. The eight African flagship universities formed the empirical cases for the research, but the project started with a review of two countries and a state in the United States (South Korea, Finland and North Carolina) that had been successful in connecting higher education to development. The HERANA Phase 2 project also drew on work that CHET had been doing in South Africa on performance indicators and differentiation since 2003, as well as a recent project with Manuel Castells on *Reconceptualising Development in the Global Information Age*. So, while the research focus of this book consists of the eight African universities, the theoretical underpinnings are global and, we think, many of the implications are far wider than the universities studied.

The HERANA project is focused on contributing to a better understanding of the (positive and negative) factors that affect African flagship universities in their knowledge production function. A better understanding of these factors, including from a cross-African comparative

1 For further information on HERANA Phase 2 research projects and outputs, see http://www.chet.org.za/programmes/herana-ii.

perspective, will make it possible for each individual institution and the national authorities involved to develop more appropriate policies and to use more effective policy tools and incentives for stimulating the performance of the university in the direction the country requires; that is, in the direction of becoming a stronger and more relevant knowledge-producing university. This implies that the project is not set up to analyse the actual contribution of the participating universities to economic development, nor is the HERANA project aimed at finding and promoting 'best practices'. Neither is the project set up to measure the performance of individual African academics, or to identify ways in which African universities can increase their income. That is not to say that understanding the actual impact of African universities, producing multi-level performance overviews, or stimulating income-enhancing activities are unimportant; far from it. However, these issues lie beyond the HERANA project.

Finally, from the outset, the priority of the project was on both the 'R' and the 'A' of HERANA; that is, on empirically based research linked to a multipronged advocacy component. Reflecting on the findings of HERANA Phase 1, Sir Peter Scott suggested that this yoking of research and advocacy is both radical and revealing. He concluded that the 'work of HERANA suggests that it is to the global "periphery" (in fact, the global "majority") that we should turn to anticipate the future of higher education in all its frailty and potential'.

François van Schalkwyk, AHED Series Editor
with Nico Cloete and Peter Maassen

CHAPTER 1

ROLES OF UNIVERSITIES AND THE AFRICAN CONTEXT

Nico Cloete and Peter Maassen

The roles of universities in society

After the publication of the final report by the National Commission on Higher Education (1996) in South Africa, the newly formed Centre for Higher Education Transformation decided to contribute to strengthening the knowledge basis on the role and functions of higher education in Africa by combining traditional higher education studies with more general scholarly reflections on the change dynamics of higher education. This led to a first series of seminars, organised around presentations by prominent scholars such as Mahmood Mamdani and Kwame Appiah, and well-informed practitioners such as Peter Scott, Donald Ekong and Malegapuru Makgoba. The series resulted in a book called *Knowledge, Identity and Curriculum Transformation in Africa* (Cloete et al. 1997). This was followed in 2000, and then again in 2009, by seminars involving Manuel Castells – one of the world's leading social scientists known especially for his research on the network society, communication and globalisation. On both occasions, Castells gave a special lecture on higher education that contributed to the publication of two books. The first, *Challenges of Globalisation: South African Debates with Manuel Castells* (Muller et al. 2001), was primarily about the challenges that South Africa and its universities were facing during rapid globalisation. The second, *Universities and Economic Development in Africa* (Cloete et al. 2011), concerned itself more directly with the roles of the university in development in Africa in relation to the knowledge economy.

In his special lecture at the University of the Western Cape in 2009, Castells provided a typically encompassing, but interlinked view, of higher education in society (Castells 2009: 1):

> *We live in a global knowledge economy and in societies based on processing information, which is a primary university function. This implies that the quality, effectiveness and relevance of the university system will be directly related to the ability of people, society, institutions, to develop. In the context of a technological*

> *revolution and in the context of a revolution in communication, the university becomes a central actor of scientific and technological change, but also of other dimensions – of the capacity to train a labour force adequate to the new conditions of production and management. They also become the critical source of equalisation of chances and democratisation of society by making possible equal opportunities for people – it's not only a contribution to economic growth, it's a contribution to social equality or, at least, lesser inequality. Something else is their ability to develop new cultures; that is, to be the source of cultural renewal and cultural innovation which is linked to the new forms of living in which we are entering. Universities also have been dramatically affected by technological change itself – being an institution that processes information, its information and communication technologies are affecting deeply the functioning and the culture of the university, sometimes without full knowledge of what's happening and without controlling these processes. Yet, in spite of all these challenges, all these possibilities, all these opportunities for the university system, in many, many cases universities continue to be corporatist and bureaucratic, defending their own interests – particularly in terms of the professors – and extremely rigid in their functioning in terms of their administration.*

Castells is referring here to the core functions of the university. He echoes in this the work of many great thinkers on the ideas underlying the university including Alexander von Humboldt, Cardinal Newman and, more recently, Clark Kerr. The latter emphasised that research universities cannot be single-purpose institutions, but rather must be pluralistic in the sense of combining various functions. In his work, Kerr has argued that it is far too simple to claim that the three main university functions are teaching, research and service (see, for example, Kerr 1991: 47–67). Instead, he observes that the university has a series of functions related to production (such as selection of talents, training and research); to consumption (such as general education, community life and a holding operation); and to citizenship (such as socialisation, critical evaluations and democratisation). According to Kerr (ibid.: 65):

> *The reality is a pluralistic university system in a pluralistic society serving many functions including constant evaluation of society. The single-purpose campus is as unlikely as the single-purpose wife or husband; the nature of both is to serve more than one function. Nor can there be a single model for the multi-purpose campus, since some functions combine better than others and there are a number of functions in totality to be performed by higher education.*

Drawing on Kerr and the Castells (2001: 206–212; 2009) lecture series referred to above, the four key roles of higher education could be summarised as follows. Firstly, historically, universities played a major role as ideological apparatuses – that is, as producers of *values and social legitimation*. These institutions were rooted in the European tradition of church-based

theology schools (e.g. Bologna, Cambridge, Oxford, Harvard and Salamanca). Other non-religious universities played a similar role in producing, for instance, imperial values in the case of some of the major universities, and of justifying domination and western superiority in the colonial world. But, as times changed, a key task of these institutions became the shaping of civic values and 'flexible personalities' in the development of prospective (re-centring) identities, which uses future-orientated narratives to construct a new basis for social belonging and citizenship (Cross et al. 1999). To this day, the formation and diffusion of ideology is still a fundamental role of universities, despite claims to being non-ideological (ibid.: 206).

The second role – historically as important as the production of values – was *the selection of the dominant elites.* The selection of the elites is accompanied by a socialisation process that includes the formation of networks for their social cohesion, and the establishment of codes of distinction between them and the rest of society (Castells 2001: 207). Values and elite selection became closely connected networks exemplified by, for example, the Ivy League institutions in the United States, the *grandes écoles* in France, or Cambridge and Oxford in England. But, as demand for access to higher education grew, universities differentiated. And while for some institutions elite selection and formation remained their primary role, large numbers of generalist universities emerged that increased higher education participation rates dramatically. Martin Trow (2007) referred to this as the shift from elite (15% participation rate) via mass (15–40%) to universal (over 40%) higher education; or in Peter Scott's (1995) terms, the massification of higher education. Scott's important contribution was to show that massification is not just a linear expansion of participation; it is also an integral part of modernisation, with associated socio-economic, cultural and science and technology changes. For Scott (ibid.: 1), a characteristic of massified systems is that they are 'endlessly open, radically reflexive with considerable ambiguity and radical discontinuities'.

In these massified systems, the notion of 'elite' has changed dramatically – from the university selecting students belonging to a political and/or socio-economic elite class, to the university being an institution for selecting academic talents; that is, an academic elite, independent of (or at least much less dependent on) class or background. However, in established massified systems such as the United States, higher education could also become an iron cage for the elite. John Shaplin (2014), reviewing Thomas Pikkety's work on university endowments, education and social mobility, reports that research shows that the proportion of college degrees earned by children whose parents belong to the bottom two quartiles of the income hierarchy stagnated at 10–20% during the period 1970 to 2010. By contrast, the proportion of college degrees earned by children whose parents are in the top quartile increased from 40% to 80% – meaning 'parental income is an almost perfect predictor of university access' (ibid.).

The third role for universities was the *training of the labour force*. The professional university has always had this basic function, ever since it started specialising in the training of church bureaucrats. Both the Napoleonic model (with its introduction of *grandes écoles*) and the Chinese Imperial systems used specific institutions to select and prepare the state bureaucracy

(Castells 2001). However, this role extended to other emerging professions: the schools of medicine, law and engineering were critical as training institutions for industrialisation development. In due course, 'training' changed from the reproduction or transmission of 'accepted' knowledge to 'learning to learn' or becoming 'self-programmable' workers, which refers to the ability to change and adapt to many different occupations and new technologies all through one's professional life (ibid.).

The fourth role for universities is associated with the relatively late invention of the German research university model that emerged in the second half of the 18th century. This saw the development of a different type of university that could be called a 'science university', in which the primary focus is on the *production of scientific knowledge*. While the science orientation seems to be the most obvious function of a university (implying the generation of new knowledge), the true research-intensive university forms a minority institution in higher education systems, and particularly so in developing countries (Altbach 2013).

The popularity of the research-orientated university came from the success of the German universities which, by 1933, had trained and employed twice as many Nobel prize winners as the universities in the US and United Kingdom at the time combined (Watson 2010: 35). After the Second World War, this dominance was taken over by the US university system. In certain respects, the US system combined the classic German research university model with the so-called 'Land-Grant' university model, which had a specific focus on *science with application into society*.[1] Originally, the role of these Land-Grant universities was to develop and apply knowledge for improving the productivity of US agriculture; to contribute to solving specific problems resulting from the rapid urbanisation of the US (Gornitzka & Maassen 2007); and to support the development of specific industries that had regional or national importance. Other key functions of the Land-Grant universities that are seldom mentioned included the requirement of the provision of extension services (especially in the area of agriculture), and the stated intention to provide greater access to higher education throughout the country (Douglass 2007).

As emphasised by Kerr, a challenge for universities is that they cannot specialise in only one function; indeed, many try to fulfil all four roles at the same time. Therefore, a critical element in the structure and dynamics of university systems is to combine and make compatible various, sometimes contradictory, functions. For example, ideological apparatuses are not purely reproductive machines, as Pierre Bourdieu sometimes implied;[2] thus both conservative and radical ideologies are not only in the system but in individual universities as well. And often, the more the socio-political rule of society relies on coercion than on consensus, the more universities become centres of challenge to the political system. In such cases, universities are still predominately ideological apparatuses, although they work for social change rather than for social conservatism (Kerr 1991: 11).

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1 The Land-Grant universities were established via the Morrill Act of 1862 (which was amended in 1890). Interestingly, both the Massachusetts Institute of Technology and the University of California, Berkeley started as Land-Grant universities. See http://www.ifas.ufl.edu/land_grant_history/ for a brief history of the Land-Grant universities.

2 See, for example, Bourdieu and Passeron (1990).

Another tension arose when the developmental potential of universities became apparent and many countries tried to build research universities, technology institutes and university-industry partnerships. After centuries of using universities as ideological apparatuses and training institutions, the university rather quickly came under pressure to be a productive force – implying that universities had to be connected simultaneously to the informational economy and to the socio-cultural changes the society was undergoing (Gornitzka & Maassen 2007). Here, the issue is not to have universities as societal transformers, or to isolate the universities from the social into secluded laboratories or the boardrooms of multinational firms, but to develop institutions that are solid and dynamic enough to withstand the tensions that will trigger the simultaneous performance of possibly contradictory functions. As Castells (2001: 14) put it:

> *The ability to manage such contradictions while emphasizing the universities' role in generating knowledge and training labour in the context of the new requirements of the development process will to a large extent determine the capacity of countries and regions to become part of the new world economy.*

Finally, in the current conditions of the global knowledge economy, knowledge production and technological innovation become the most important productive forces. This requires that every country has at least some level of a *national research system* (comprising universities and other types of higher education institutions, private sector and public research centres, and private sector research and development) in order to be able to participate in the global knowledge economy (Castells 2009). There has been a growing policy focus on the university's contributions to innovation and economic development – the main assumption being that more complex and competitive economic and technological global environments require rapid adaptation to shifting opportunities and constraints. As such, the university is expected to play a central role in this adaptation since, as the main knowledge institution in any society, it is assumed to link research and education effectively to innovation.

This expectation has been the underlying rationale for reforms aimed at stimulating universities to develop more determined institutional strategies and a strong, unitary and professional leadership and management capacity. Furthermore, higher education policies have become increasingly coordinated with other policy areas, such as innovation and technology, as part of national (and supranational) knowledge and innovation policies (Braun 2008: 234). At the same time, there is a growing insight into the simplicity and relative one-sidedness of these policies. As is argued by Mazzucato (2013: 52), in her seminal book *The Entrepreneurial State,* it is crucial to separate the role of the university in the production of knowledge from the role of industry in innovation through the development of early stage technologies: 'Getting universities to do both runs, amongst other things, the risk of generating technologies unfit for the market.'

The African context

Both the British government, following the Asquith Commission (1945), and the French, following the Brazzaville (1944) meeting, saw the universities in the colonies as extensions of the British and French university systems, and assumed that the best students would study in the metropolis (Sherman 1990). The model was not Oxbridge or *grande écoles*. According to Castells (2001: 213), the recruitment of social elites – first for the colonial administration and later for the new political regimes – became the fundamental function of universities in the 'Third World' – not only in Africa, but also in Latin America and East Asia. Mamdani (2008) concurs with this by stating that the purpose of Makerere University in Uganda was to train a tiny elite on full scholarships (which included tuition, board, health insurance, transport and even a 'boom' to cover personal needs). From the point of view of the students, this was an extraordinary opportunity; from the point of view of the society, an extraordinary privilege (ibid.: 1).

Higher education in Africa is still an elite system, although the private sector has increased access to mainly small, low-quality institutions which, in the majority of cases, should not be called universities.[3] The higher education participation rate in sub-Saharan Africa is still much lower than in the rest of the world, currently averaging from 5–10%. Of the eight countries[4] in the Higher Education Research and Advocacy Network in Africa (HERANA) project specifically, only Mauritius and Botswana had a participation rate above 20% by 2012 (World Economic Forum 2012). There has been a common misconception that a major problem in African higher education is that it has massified without resources. In reality, nowhere on the continent is there a differentiated and massified system; there are only overcrowded elite systems.

However, when it came to the ideological apparatus function, things unravelled very quickly owing to the instability of the conflicting and competing political elites, and the universities were cauldrons of conflicting values ranging from conservative-reformist to revolutionary ideologies. The contradictions between academic freedom and political militancy, and between the drive for modernisation and the preservation of cultural identity, were detrimental to the educational and developmental task of the university. These new universities could not merge the formation of new elites with the ideological task of forging new values and the legitimation of the state (Castells 2001: 213).

This 'hindsight' analysis of Castells does not mean that there was not an intention for or a discourse about the university contributing to professional training and, more broadly, to development. A basic assumption following independence was that universities in Africa[5] were expected to be key contributors to the human resource needs of their countries: in particular, the development of human resources for the civil service and the (public) professions. This was

3 One of the most bizarre examples of this is Mauritius where, with a population of less than 1.5 million, there are more than 60 'universities'.

4 Botswana, Ghana, Kenya, Mauritius, Mozambique, South Africa, Tanzania and Uganda.

5 At the time of independence, higher education in most African countries was mostly limited to a single national university. It is thus not possible to speak of a higher education 'system' at that time.

to address the acute shortages in these areas that were the result of the gross underdevelopment of universities under colonialism, as well as the departure of colonial administrators and professionals following independence. The training function in Africa has become more important – although not as important as the 'explosion' in Asian universities, which have increased their enrolment and technical training on an unprecedented scale (Carnoy et al. 2013). African universities have also grown, but much more moderately than their counterparts in the rest of the world, and mainly at the lower degree or diploma levels. Furthermore, much of the growth in student numbers has taken place in traditional fields such as law, humanities and the social sciences, rather than in science, engineering and technology (Bunting et al. 2014; Kapur & Crowley 2008).

Soon after independence, a 'development' discourse emerged and 1960 was heralded as the 'Year of Africa' and the beginning of the so-called 'development decade'. In September 1962, UNESCO hosted a conference on the 'Development of Higher Education in Africa'. A decade later, in July 1972, the Association of African Universities held a workshop in Accra which focused on the role of the university in development (Yesufu 1973). The importance of the university in newly-independent African countries was underscored by the now-famous 'Accra declaration' that all universities must be 'development universities' (ibid.). Controversially, workshop participants agreed that this was such an important task that the university could not be left to academics alone; it was also the responsibility of governments to steer universities in the development direction.[6]

While many nationalist African academics enthusiastically supported the role of the 'development university', seeing it as a plus in their contestations with the expatriate professoriate that dominated institutions, it sat uncomfortably with expatriates and some 'globally orientated' African academics. This latter group was more comfortable with the traditional model of the university as a self-governing institution (i.e. governed primarily by scholars) that predominated in the UK and the US at the time. This self-governing model was the dominant model during the first two decades following independence and there was considerable agreement between universities and 'liberation' governments[7] that the role of elite universities was to produce human capital for the new state.

Despite the rhetoric about the 'development university', African governments did little to promote the development role of these institutions. In part this was because many of these governments had not developed a coherent development model, with notions of what the role of the universities would be. Instead, many had become increasingly embroiled in internal power struggles, as well as the external politics of the Cold War and the politics of funding agencies such as the World Bank. Instead, 'not leaving the universities alone' became interference by government, rather than steering (Moja et al. 1996). Furthermore, universities

6 Arguably, this was the last time, until 2009, that governments in Africa agreed, at least in continental statements, that universities are important for development (MacGregor 2009).

7 Many of the liberation leaders had studied at foreign universities.

became sites of contestation – partially around the development model of the new state, and partially around the lack of delivery which included inadequate funding for the institutions. The result was that many governments, other stakeholders and academics became sceptical, if not suspicious, of the university's role in national development.

It was during this period that the World Bank in particular – in part based on the infamous 'rate of return to investments in education' study (Psacharopoulos et al. 1986) – concluded that development efforts in Africa should be refocused to concentrate on primary education. This is clearly evident in the dramatic decreases in per capita spending on higher education in Africa, as reported in a World Bank report: 'Public expenditure per tertiary student has fallen from USD 6 800 in 1980, to USD 1 200 in 2002, and recently averaged just USD 981 in 33 low-income SSA [sub-Saharan Africa] countries' (World Bank 2009: xxvii). This was a staggering decrease of 82% (Hayward & Ncayiyana 2014). At a meeting with African vice-chancellors in Harare in 1986, the World Bank went so far as to argue that higher education in Africa was a 'luxury' and that most African countries would be better off closing their universities at home and training graduates overseas instead. When the Bank realised this position was unsustainable, they modified it to arguing that universities should be trimmed down and restructured to train graduates only in the skills that the market required (Mamdani 1993). This was followed by a number of privatisation drives which in 1997 at Makerere University led to the creation of part-time and temporary staff, competition between faculties for vocational (income-generating) courses, and, later, the introduction of private and public students in the same public university. The cumulative effect of this was, according to Mamdani (2008), the commercialisation of the university at the expense of quality and research.

Castells (2001) argued that the major area of underperformance in Africa and, to some extent, Latin America is in the research or 'generation of new knowledge' function. Africa is at the bottom of almost every indicator-based ranking and league table in science and higher education. For instance, in 2002, Africa's share of publication output was 1.6% and of researchers by region/continent was 2.2%. By 2008, Africa's share of publications had risen to 2.5% although the share of researchers declined slightly, from 2.2% to 2.1% (Zeleza 2014). However, there have been further positive improvements since 2008 which will be discussed in the next chapter.

In his 2000 lecture, Castells presented a number of structural and institutional reasons which might explain the lack of progress in research. These included low funding levels and 'the cumulative character of the process of uneven scientific development' leading to, amongst others, a lack of centres of excellence that were at the cutting edge of a specific area of specialisation (Castells 2001: 215–217). In other words, the academic environment in African universities is not attractive enough for talented national scholars who, as a consequence, move to universities abroad (especially in North America and Europe) which offer more attractive academic environments. In addition, the main institutional reason for a lack of progress is argued to be the difficulties African universities have in managing contradictory functions (i.e. managing the political and ideological functions alongside the academic activities of the university).

However, as we will show in the next section, there was a revitalisation of higher education in the post-2000 period and a number of the accepted reasons for poor performance no longer held. Over the last 10 to 15 years, universities and university systems have gone through far-reaching quantitative and qualitative changes in many developing countries and emerging economies such as the so-called BRICS[8] countries. In general, though, sub-Saharan universities appear to be lagging. The transformation of universities worldwide is discussed by Altbach and Balán (2007) who, in their book *World Class Worldwide*, focus on the transformation of research universities in Asia and Latin America. According to these authors, their analysis did not include Africa because they believed that 'Africa's academic challenges are sufficiently different from those of the nations represented here that comparison would not be appropriate' (ibid.: vii). Strikingly, the authors did not provide any arguments or data to support their claims.

The revitalisation of higher education in Africa

The gloomy analyses of higher education in Africa by Castells and Mamdani presented above were largely based on the four decades from 1960 to the end of the 1990s. During the late 1990s and early 2000s, some influential voices started calling for the 'revitalisation' of the African university and for linking higher education to development (Sawyerr 2004). From this followed a series of revitalisation initiatives and this issue will be revisited again in 2015 at an all-Africa higher education summit in Dakar.

Perhaps a brief reflection on the term 'revitalise' is appropriate. The Collins dictionary defines revitalise as 'breathe new life into, bring back to life, reanimate, refresh, rejuvenate, renew, restore, resurrect'. This raises questions as to what has to have new life breathed into it or to be restored or resurrected. Mamdani provided an evocative reflection during the 1990 symposium on academic freedom held in Kampala and organised by the Council for the Development of Social Research in Africa, which suggests that the revitalisation needed had to do with 'relevance' (Mamdani 1993: 11):

> *We discovered local communities, communities which we had hitherto viewed simply as so many natural settings. Forced to address these communities, we were compelled to look at ourselves from the stand-point of these communities. We came to realise that universities have little relevance to the communities around us. To them, we must appear like potted plants in greenhouses – of questionable aesthetic value – or more anthropological oddities with curious habits and strange dresses, practitioners of some modern witchcraft. To academics accustomed to seeing ourselves as leaders-in-waiting or students accustomed to be cajoled as the leaders*

8 Brazil, Russia, India, China and South Africa.

> *of tomorrow, these were indeed harsh realities. We were forced to understand the question of relevance, not simply narrowly from the point of view of the development logic of the state, or even narrower market logic of the IMF and the World Bank, but broadly from the point of view of the needs of surrounding communities. But we had always resisted any demand for a broad relevance in the name of maintaining quality. Faced with popular pressures for democracy in education, universities and independent states were determined, not only to preserve intact those universities inherited from colonial mentors but also to reproduce replicas several times over to maintain standards.*

From another perspective, is the university that needs to be revitalised the 'commercialised' Makerere University referred to earlier? Mamdani (2008) described this commercialisation as reform that devalued higher education into a form of low-level training that lacked a meaningful research component. And, while Makerere is a case study of market-based reform at a single university, it raises larger issues about neo-liberal reform of public universities globally (ibid.: vii). Or, does revitalisation mean that new life must be breathed into university systems where the 'generation of new knowledge' function is the major area of underperformance (Castells 2001)?

Interestingly, most of the revitalisation reports were produced in preparation for major donor-driven events. Both the Sawyerr (2004) publication and the African Union/NEPAD (2005) workshop report, *Renewal of Higher Education in Africa,* contributed to the Gleneagles G8 summit. Similarly, the United Nations University project report (2009), *Revitalizing Higher Education in Sub-Saharan Africa,* but particularly the Pityana (2009) paper, *Revitalisation of Higher Education: Access, equity and quality*, were prepared for and delivered as proposals to the 2009 UNESCO World Conference on Higher Education. No systematic assessment of the outcomes of these pleas for revitalisation has been done. However, in an overview of the public donor dimension in Africa, Maassen and Cloete (2010) wrote that while the G8 summit certainly created a momentum for a new focus in Africa, the G8's renewed commitment to Africa was far from uncontroversial: not only did part of the British government react negatively, but agencies such as the United Nations Envoy for HIV/Aids and even the International Monetary Fund responded critically to some of the proposals.

Regarding higher education in particular, two of the most important documents to be released following the G8 summit were the *Africa Action Plan* and the *Report of the Commission for Africa*. The *Africa Action Plan* focused broadly on developing research and higher education capacity as well as information and communication technologies. The Commission for Africa report identified four priorities in the sector, namely professional skills, physical infrastructure, human resources and research capacity. It specifically called for a fund of USD 500 million to be created for revitalising African institutions of higher education and a fund of

USD 3 billion for strengthening science, engineering and technological capacity.[9] Of the call for USD 500 million, only the USD 10 million allocated by the UK Department for International Development (DFID) to the Association of African Universities during 2006 could be seen as a direct outcome of the G8 meeting. However, what did change was that DFID, in responding to the UN Millennium Development Goals and the UK Prime Minister's enthusiasm during the G8, finally abandoned their rather slavish support for the outdated World Bank policy to not support higher education – long after the World Bank itself had abandoned this position (Maassen & Cloete 2010).

As for the UNESCO World Conference, the most positive outcome was the unanimous expression of support for the importance of higher education by a group of 16 African ministers of education at a preparatory meeting in Dakar entitled 'New Dynamics on Higher Education and Research: Strategies for Change and Development.'[10] In particular, the ministers 'called for improved financing of universities and a support fund to strengthen training and research in key areas' (MacGregor 2009). Perhaps more importantly, MacGregor (ibid.) reported that there had been considerable awareness about the role that should be played by knowledge as the driving force of development with an emphasis on reforming higher education systems. Ironically, however, soon after committing to an increased emphasis on strengthening higher education at the World Conference, UNESCO itself then devalued the status of higher education by merging the higher education division with the general education division within its own structures. Since then, not much has emerged from this structure which, in 2014, is without a director.

Concurrent to the revitalisation discourse, other voices arose to support higher education in Africa. The World Bank itself, influenced by Castells' (1993) 'engine of development' paper, started to embrace the idea of the role of higher education in the knowledge economy and for development in the developing world. In 2002, the World Bank report *Constructing Knowledge Societies: New Challenges for Tertiary Education* described how tertiary education contributes to building a country's capacity for participation in an increasingly knowledge-based world economy, and investigated policy options for tertiary education that had the potential to enhance economic growth and reduce poverty (Salmi 2002). This amounted to a 360-degree turnaround from the Bank's earlier notion of higher education as a 'luxury'. However, in personal communications, Salmi admitted that the Bank had neither the political will nor the capacity to implement a programme to build capacity in African countries to participate in the knowledge economy. To its credit, the World Bank did sponsor studies such as Bloom et al. (2006), which empirically demonstrated a relationship between investment in higher education and an improvement in gross domestic product in Africa. Additional evidence has been generated by subsequent studies by the African Development Bank (Kamara & Nyende 2007) and the World Bank (2009).

9 It has to be noted that the Commission charged with making recommendations to the G8 did not directly represent the G8.

10 This title is arguably a considerable improvement on 'revitalisation'.

A much stronger political voice came from Kofi Annan, the then Secretary General of the United Nations, who strongly promoted the importance of universities for development in Africa (quoted in Bloom et al. 2006: 2):

> *The university must become a primary tool for Africa's development in the new century. Universities can help develop African expertise; they can enhance the analysis of African problems; strengthen domestic institutions; serve as a model environment for the practice of good governance, conflict resolution and respect for human rights, and enable African academics to play an active part in the global community of scholars.*

While the above statements clearly demonstrate support for the role of higher education in development, they do little to clarify what this role is. There seem to be two different notions hidden within the idea of a 'development tool' – a direct instrumentalist or 'service' role and an 'engine of development' role that is based on strengthening knowledge production and the role of universities in innovation processes.

The instrumentalist role is arguably the more dominant of the two notions in Africa. For instance, the demands for university revitalisation by, especially, foreign donors and multilateral agencies such as the United Nations and UNESCO are, in many cases, underpinned by the assumption that universities are 'repositories of expertise' that should be applied to solving pressing development issues, such as poverty reduction and education for all. This thinking of 'university as service provider' in Africa is also strongly present within academia itself, and particularly in certain postcolonial contexts. *University World News* reported that at the Association of Commonwealth Universities conference (April 2010) it was stated that: 'Universities must be "citadels not silos", defending communities around them rather than being inward-looking, if they are to actively advance global development goals' (MacGregor & Makoni 2010), and that universities must 'orientate their activities more directly towards supporting UN Millennium Development Goals' (MacGregor 2010). The chief executive officer of the Southern African Regional Universities Association, Piyushi Kotecha, argued that in recent decades, higher education has assumed growing importance for both personal development and for driving social and economic development: 'Now more than ever before, higher education in developing nations is being expected to take on the mantle of responsibility for growth and development, where often governments fail' (ibid.). This 'direct' instrumentalist notion assumes that universities have a concentration (surplus) of expertise, and presumably spare time, that must be applied directly, or in partnership, to pressing socio-economic issues such as poverty, disease, governance and the competitiveness of private firms or companies.

The second role for higher education embedded in Annan's 'development tool' is Castells' 'engine of development' notion which, as highlighted earlier, has become the dominant discourse for many developed countries. The underlying vision of this notion is the need to create a

university that is dynamic and responsive to socio-economic agendas and that gives priority to innovation, entrepreneurship and competitiveness. Supporting Annan (perhaps on the other end), the high-profile African scientist at Harvard University, Calestous Juma, has promoted the role of higher education in science-led development through, amongst others, the UN Millennium Project Task Force on Science, Technology and Innovation (Juma & Yee-Cheong 2005). In addition, the African Ministerial Council on Science and Technology, established in November 2003 under the auspices of the African Union and the New Partnership for Africa's Development, created a high-level platform for developing policies and setting priorities on science, technology, research and innovation for development in Africa.

In conclusion, in developing countries, and especially in sub-Saharan Africa, there are different forces and policy arguments driving university dynamics. Here the university is positioned in a development cooperation policy arena where the dominant actors are operating in policy frameworks co-determined by ministries of foreign affairs and development cooperation agencies. The development mission of the university is primarily linked to poverty reduction and community support, rather than economic competitiveness, entrepreneurship and innovation. This raises two key questions: What are the consequences of these different policy frameworks for African universities? And, how do they affect the circumstances under which African universities are expected to contribute to economic development?

The HERANA project: Empirical evidence on the African higher education context

While Castells' analyses of the functions of universities outlined above provide an innovative, sociologically based framework for discussing the development of universities around the world, in the case of Africa, these analyses were not informed by strong empirical evidence. Many negative stories are told about African universities when it comes to their facilities, research output, overcrowded lecture halls, weak leadership and so on. But are these stories all there is to tell? The HERANA project did not take these factors as given but instead conducted detailed empirical analyses of the change dynamics in the eight African flagship universities included in the study[11] and their socio-economic and political contexts, guided by an analytical framework developed as part of the HERANA project.[12]

This book reports on a set of interlinked studies that have been undertaken as part of HERANA Phase 2 since 2011. In so doing, it brings to bear empirical evidence relating to the various factors that are currently influencing the ability of Africa's flagship universities to transform themselves into research-intensive institutions. Where appropriate, the chapters also

11 The universities of Botswana, Cape Town, Dar es Salaam, Eduardo Mondlane, Ghana, Mauritius, Makerere and Nairobi.

12 For details of the analytical framework, see Cloete et al. (2011).

reflect on the empirical evidence presented in relation to Castells' thesis on the contradictory functions of contemporary universities, as outlined in this introductory chapter.

Outline of chapters

Chapters 2 to 5 assess the *performance of the eight African flagship universities* according to different indicators related to knowledge production:

- Chapter 2 follows directly from Chapter 1 by presenting core data on research productivity in each of the HERANA universities, with a specific focus on masters and doctoral enrolments and graduations, the proportion of academic staff with PhD degrees, and research publication outputs.
- Chapter 3 builds on the empirical analyses discussed in Chapter 2. It describes and explains the steps taken in developing a methodology for assessing the performance of the eight universities. It then provides an assessment of these institutions against a set of goals and output targets for the academic core of South Africa's category of 'traditional university', and presents these assessments in the form of radar graphs, which can be used as diagnostic tools.
- Chapter 4 describes a bibliometric case study of the eight HERANA universities. Focusing on the internationalisation of their research activities, bibliometric data are presented on general trends over the period 2006–2012 in terms of growth of internationally co-authored journal articles and the citation impact of those publications in the Web of Science.
- Chapter 5 presents data on the internationalisation of the doctorate in South Africa, with a specific focus on PhD enrolments and graduations by nationality, field of study, gender and university for the period 2000–2012. It analyses the trends in average growth rates among doctoral students from South Africa and the rest of Africa. The chapter discusses a range of factors and policy implications that relate to the possibility of South Africa becoming a PhD hub for the continent.

Chapters 6 and 7 relate to *research incentives in African universities*:

- Chapter 6 presents the main findings of a study on faculty perceptions of the factors that influence research productivity at Makerere University. The chapter describes the environmental and individual factors that have shaped the research function at Makerere University through four major perspectives: individual factors, organisational factors, funding and research culture.
- In seeking to understand how financial incentives shape academic productivity as measured by academic publishing and the successful supervision of postgraduate students,

Chapter 7 presents and analyses data from two case studies, namely the incentives in place and the remuneration of selected public sectors in Mozambique, to establish how the professoriate at Eduardo Mondlane University is paid compared to other professions, and the incentives at the University of Nairobi and how these shape academic productivity.

Chapters 8 and 9 turn to *system-level governance arrangements for higher education*, with a specific focus on the roles and functions of government agencies:

- Chapter 8 reports on the findings of a study on the strategic priorities, objectives and practices of science granting councils in 17 countries in sub-Saharan Africa. The chapter describes the organisations and their institutional arrangements for supporting science, technology and innovation in the various countries; analyses subsequent strategies for funding of STI in countries where science granting councils do not exist; and assesses the science granting councils' partnership modalities and collaboration.
- Chapter 9 reports on the findings of the study into the roles and functions of higher education councils and commissions in the eight HERANA countries. The chapter explores the reasons for the establishment of these agencies as well as their legal frameworks, structures and resources. It considers the mandated and de facto functions undertaken by the councils/commissions and the (potential) roles they were playing in the governance (steering and coordination) of their respective higher education sectors.

Chapters 10 and 11 focus on aspects of *universities' 'third mission' of engagement*:

- Chapter 10 reports on research into devising indicators on university engagement activities by conceptualising engagement as 'interconnectedness'. Interconnectedness describes the relationship (in tension) of academics engaging with those outside of the university, while simultaneously linking back to the university's core functions of research and teaching and learning.
- Chapter 11 explores which aspects of student engagement effectively develop high-level citizenship competences among undergraduate students in African universities. It presents and analyses data collected via the Student Experience in the Research University survey, with its additional Citizenship Module, that was conducted at the University of Cape Town and Makerere University.

Finally, Chapter 12 returns to Castells' four functions of the university, discussed in Chapter 1, and presents data on three of the universities in the HERANA project (Mauritius, Nairobi and Makerere) in order to illustrate the kinds of problems that African universities may face in managing these possibly contradictory functions. The chapter concludes by highlighting a range of systemic and institutional policy issues that could be gleaned from the evidence and analyses presented in the book.

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CHAPTER 2

RESEARCH UNIVERSITIES IN AFRICA: AN EMPIRICAL OVERVIEW OF EIGHT FLAGSHIP UNIVERSITIES

Nico Cloete, Ian Bunting and Peter Maassen

The development role of universities in Africa

Following independence during the 1950s and early 1960s, Africa's new national universities were expected to be the key contributors to the high-level human resource needs of the country, particularly in providing personpower for the professions and the bureaucracy. This was to redress the acute shortages in these areas as a result of the gross underdevelopment of universities during colonialism and the departure of colonial administrators following independence. By the early 1970s the focus had shifted, as was reflected in the Association of African Universities Declaration at the end of the Accra Conference, with the conclusion that all universities must be development universities (Yesufu 1973). Despite the development university rhetoric, during the next two decades African governments did little to promote the development role of the university, partly because governments did not have a coherent model on how to do this, and partly because of broader political and socio-economic struggles that were often fuelled by Cold War and funding agencies' agendas, with the World Bank playing a particularly pernicious role (Samoff & Carrol 2004).

In the post-2000 period, development returned to the agenda. Kofi Annan, the then Secretary General of the United Nations, declared: 'The university must become a primary tool for Africa's development in the new century' (quoted in Bloom et al. 2006: 2). This was endorsed by a group of African Ministers of Education at the preparatory meeting for the UNESCO World Conference on Higher Education in 2009 (MacGregor 2009). While these statements expressed support for higher education to contribute to development, they did little to clarify the role of either the government or the university.

Closer examination of the different calls for a developmental role for universities reveals

two somewhat contradictory notions: a direct instrumentalist (or service role), and an 'engine of development' role which is based on strengthening knowledge production and innovation (Maassen & Cloete 2010). The instrumentalist role is arguably the more dominant and is, in addition to governments, strongly driven by foreign donors and multilateral agencies such as UNESCO, the United Kingdom's Department for International Development and the Norwegian Agency for Development Cooperation. The underpinning assumption seems to be that universities have a concentration – even a surplus – of expertise which should be applied to solving pressing social and health problems. Not only is this direct service role inimical to the mission of the university, it is quite ironic that many of the development agencies and foundations operate from countries (such as the United States, the UK, Norway and the Netherlands) where the higher education system is located within a knowledge economy policy framework, while at the same time – particularly through the influence of Foreign Affairs departments – they drive a more direct instrumentalist approach in Africa (ibid.). In an extensive study of bilateral country investments and foundation partnerships to support higher education in Africa, Maassen and Cloete (ibid.: 268) concluded that 'none of the donor countries involved subscribes to the engine of development approach in their development cooperation policies with respect to higher education'.

The engine of development notion embedded in Annan's development tool has since become the dominant discourse for many advanced OECD countries (Olsson & Cooke 2013) and has been embraced enthusiastically by numerous developing countries, particularly the leading BRICS[1] countries such as China, Brazil and India (Carnoy et al. 2013; Cloete & Mouton forthcoming). Castells (2009: 3) argues that:

> *In the current condition of the global knowledge economy, knowledge production and technological innovation become the most important productive forces. So, without at least some level of a national research system, which is composed of universities, the private sector and public research centres, no country, even the smallest country, can really participate in the global knowledge economy.*

The need for research universities in Africa

Internationally, there is growing consensus among national policy-makers and other central socio-economic actors that the university is a driver for economic growth and development. This has to do with the role of the university in producing a highly skilled and competent labour force and in producing new knowledge. Both contributions are essential to the creation of innovation and the development of a national economy that is globally competitive. This is well summed up by Olsson and Cooke (2013: 18) in an OECD/IHERD report:

1 Brazil, Russia, India, China and South Africa.

> *Top research universities in industrialised countries (often referred to as the Super RUs) usually dominate the global ranking tables. In contrast, their counterparts in middle and low-income countries have, if anything, more important missions because they are the engines of local and regional knowledge development and natural leaders of their own evolving academic systems. As these systems become increasingly complex and the need to nurture knowledge networks for research grows ever more essential, the success of these institutions becomes even more crucial for national development policy.*

Echoing these sentiments, Altbach (2013) states that while research universities in the developing world have not yet achieved the top levels of global rankings, they are extraordinarily 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 which share values, foci and missions. However, not all universities are research universities. Research universities are a relatively small percentage of the higher education sector. In the US, the ratio is about 5% (220 research universities in a system of more than 4 000 post-secondary institutions); in the UK 25% (25 research universities among 100 universities); and in China 3% (100 research universities out of more than 3 000 institutions countrywide). In many smaller developing countries there is often only one research university and many countries have none (ibid.).

A clearly differentiated academic system is needed for research universities to flourish. For that, developing countries need to differentiate the missions of institutions in the post-secondary system and to organise institutions in a rational way. But, according to Altbach (ibid.: 328):

> *The fact is that few if any developing countries have a differentiated academic system in place; and this central organisational requirement remains a key task … These institutions must be clearly identified and supported. There must be arrangements so that the number of research universities will be sufficiently limited so that funding is available for them and that other resources, such as well-qualified academics, are not spread too thinly.*

Does Africa have research universities?

Implying that Africa is not doing well in terms of research universities, Altbach and Balán (2007) did not include Africa in their discussion on transformations of research universities in Asia and Latin America in their book *World Class Worldwide*. They justified the exclusion of Africa on the grounds that the continent's academic challenges are sufficiently different from those of Latin America and Asia (ibid.: vii), but they did not provide any empirical evidence to support this claim.

In the current context of world class and rankings, an inevitable starting point is to consider how Africa is doing in the global rankings. A recent review by Mohamedbhai (2012), former Secretary General of the Association of African Universities, shows that in the Shanghai Jiao Tong Ranking there are three African universities in the top 500: Cape Town (201–300), Witwatersrand (301–400) and KwaZulu-Natal (401–500). The *Times Higher Education* places the University of Cape Town at 103, Stellenbosch University in the range 251–275, Witwatersrand University at 251–275 and Alexandria University (Egypt) at 301–400. As can be seen, of the five African universities in the top 500 in these two main ranking systems, four are from South Africa.

Evidence about Africa's performance on the global research and science stage is not encouraging. Zeleza (2014: 1), in a broad-ranging review of Africa's performance in science, technology, engineering and mathematics shows that Africa remains at the bottom of the global science, technology and innovation league tables, and lags behind on key indicators such as the gross domestic expenditure on research and development, number of researchers and share of scientific publications and patents. While Africa is at the bottom of every indicator, a positive is that the growth of publications in Africa increased from 11 776 in 2002 to 19 650 in 2008, a growth rate of 66.9% in comparison to the world growth of 34.5%. Africa's world share of publications increased from 1.6% to 2%, Latin America from 3.8% to 4.9% and Asia from 24.2% to 30.7% (Zeleza 2014). But in terms of share of researchers by region, between 2002 and 2007, the US's share fell from 25.2% to 22.7%, Asia's increased from 35.2% to 38.2% and Latin America from 3% to 3.8%, while Africa's fell from 2.2% to 2.1% (ibid.).

A slightly more favourable picture emerges from the latest assessment of the state of science in the African Union. Using the Scopus database for peer-reviewed publications, the African Observatory for Science, Technology and Innovation (2013) reports that over the period 2008–2010, African Union publication output grew by 43% compared to the world average of 18%. If the African Union were considered a country, it would, in the BRICS context, be just behind India, China and Brazil, but ahead of Russia in publication output (ibid.).

Zeleza (2014) argues that there is a considerable literature, by both national and international agencies and scholars, on the capacity constraints and challenges facing African countries in building robust research systems. Four key issues are highlighted (ibid.: 7):

- Basing science policy on the technological and industrial needs of the particular society and integrating it into national development plans, with adequate and stable funding for implementation;
- Significantly expanding the size of and support for the higher education sector;
- Incentivising the business sector to invest in research and development by itself and through industry-university collaborations; and
- Promoting scientific literacy as a critical means of popularising science, technology and innovation in society.

However, the underlying assumption of Zeleza's (2014) synthesis is 'more for everybody' because, in Africa, no government or university sector wants openly to promote differentiation. At the same time, in all countries there are national, first post-independence universities which are much better resourced and have much higher status than most other public and private universities. Research by the Centre for Higher Education Transformation (CHET) shows that, in South Africa, the sector is differentiated into clearly distinguishable clusters or groups in terms of a wide range of performance indicators (Bunting 2013).

The approach in Africa: World-class or flagship universities?

The differentiation debate raises the question about whether Africa should have world-class or flagship universities. John Douglass (2014) reviews the distinctions between the use of these terms by arguing that a world-class university should have highly ranked research output, a culture of excellence, great facilities and a brand name which transcends national borders. Importantly, the world-class university must be rated in the upper echelons of world rankings generated each year by non-profit and for-profit entities. A research-intensive flagship 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 which permit teaching and research at the highest possible level. Worldwide, such universities play complex roles in the academic system, including delivering on the core mission of research production and training of students to engage in research (Altbach 2013). Flagship universities de-emphasise rankings and are research-intensive (or in the process of becoming so) but have wider recognised goals (Douglass 2014: 1–2). This view is supported by Berdahl (2014) who argues that the American flagship public universities, which compete for talent with the nation's best private universities, are an essential component of the US research enterprise. These universities serve the nation as well as their respective states.

Is Africa likely to have a world-class university in the foreseeable future? According to Frans van Vught, former Director of the Centre for Higher Education Policy Studies at the University of Twente in the Netherlands and a high-level expert on innovation, research and higher education at the European Commission, the answer is 'no' (Muller 2014). A recent international gathering of 200 university presidents in Chicago foresaw the following global picture (ibid. 2014):

- A first layer of highly prestigious, highly resourced and very productive universities (35–60 in number);
- A second layer of 200–250 universities in consortia – sharing resources, offering joint and mutually accredited programmes and, therefore, able to compete internationally;
- A third tier of about 200 institutions comprising a range of niche players, focused on three or four fields at most;

- A large fourth tier of mainly national and regional teaching institutions, about 24 000 in number; and
- A small group of hi-tech Massive Open Online Courses (MOOCS).

According to the scenario emerging from the global gathering of university presidents, if Africa manages a handful of second- and third-tier places, it will be doing very well indeed.

Research on flagship universities in Africa: The HERANA study

The Higher Education Research and Advocacy Network in Africa (HERANA) project started, in Phase 1 (2009), with the collection of data at the eight African universities included in the study.[2] These universities were selected because each had been the most prominent national university in its country since independence, and because each had broad flagship goals built into its vision and mission statements. It should be noted here that in the HERANA project we use the terms 'flagship' and 'research-intensive' or 'research-led' university interchangeably: while some of the HERANA members prefer the term 'flagship' and others 'research university', both are associated with differentiation with a focus on strengthening knowledge production. According to Cloete et al. (2011), each of the eight universities aimed 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; and
- Deliver knowledge products which would enhance both national and regional development.

At the time of the first data collection (2009–2010), some universities could not extract the required data because they did not have appropriate or functional electronic student and staff databases. Sometimes the data were only available in summarised tables in print format. There were also gaps in the data on electronic databases; inaccurate classifications and incomplete graduate sets; and the grades used to indicate student success in specific courses were not comprehensively captured. Some institutions did not have a central management information office in which complete data sets were stored. A consequence of this decentralisation was that different versions of students and staff data were held in different operational units. Another major problem was that the concepts of full-time equivalent (FTE) students and staff were not widely used. The HERANA data task team resolved initial data problems in a number of different ways, including copying available electronic student unit records and subjecting these

2 The universities of Botswana, Cape Town, Dar es Salaam, Eduardo Mondlane, Ghana, Mauritius, Makerere and Nairobi.

to detailed analyses, as well as using printed and internet copies of institutional annual and planning reports to verify or correct data that had been submitted by participating universities (Cloete et al. 2011).

Following groundwork on performance indicators with the participating universities laid during the first phase of the HERANA project, institutions were encouraged during the second phase (2011–2014) to further develop both their data management systems and human resource capacity for the collection of institutional data. To support this process, a manual on the collection and analysis of HERANA data was developed and distributed to institutions. The manual covered the conceptual definitions and steps required to produce the data, as well as examples of the use of this data for institutional planning. By March 2013, all of the data sets were complete (see Bunting et al. 2014a). It was clear from the interactions 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 engagement. The outcome of the revised process was that it was possible to compile the final analyses of student and staff data for 2008–2011 around six months after starting the process, compared to the almost two years taken for the collection of data for 2001–2007.

In its analyses of research outputs for 2001–2007, the HERANA project, in collaboration with the Centre for Research on Evaluation, Science and Technology at Stellenbosch University, extracted (from the Inter-Services Intelligence's [ISI's] arts and humanities, social science and science-expanded citation indexes – now called the Web of Science[3]) all papers which 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 output data for 2008–2011 (Bunting et al. 2014b).

To ensure maximum accuracy, the data that had been collected, systematised and analysed were returned to each institution's planning department in three stages for verification. The publication emerging from this research, *An Empirical Overview of Eight Flagship Universities in Africa* (ibid.), was also reviewed by each of the participating institutions before finalisation. A database which is unique to the African context was developed during this process, and contains ten years of comparable data across these eight flagship universities (see Bunting et al. 2014a).[4]

In its analyses of performance indicators, the HERANA project followed the OECD guidelines 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. For the purposes of these analyses, staff members were defined as persons who were on the payroll of a university in either a full-time or part-time

3 Web of Science website: http://thomsonreuters.com/thomson-reuters-web-of-science/.

4 The data are available on the CHET website: http://chet.org.za/data/african-he-opendata.

capacity. They were classified as permanent if they held a full-time contract of more than three years, and as temporary if they did not have such a contract. The staff employed by universities were placed into three broad categories: academic (more than 50% of time on duty on research or instruction); administrative (including executive management, deans and other senior administrative positions spending less than 50% of their time on teaching/research); and service (mainly lower-skilled, such as cleaning and gardening employees).

A key component in the analyses of performance was the link between knowledge outputs and high-level academic staff inputs of universities, which were taken to include their permanent academic staff with doctoral qualifications, and 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 the rank of lecturer or senior lecturer, while some professors and associate professors may not have doctoral qualifications. The key issue is that a university's permanent academic staff in the two groupings should be its research leaders.

Results emerging from the HERANA study

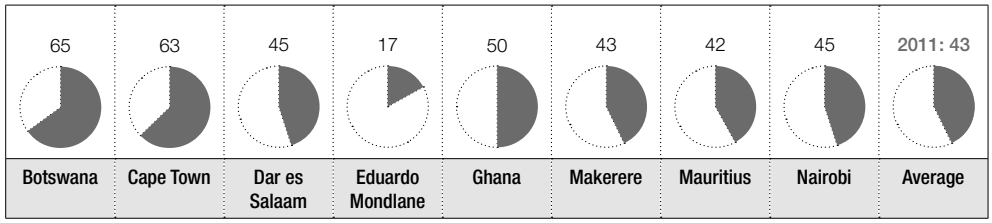
In terms of qualifications, Figure 2.1 shows which proportions of the permanent academic staff across the eight universities held doctoral degrees in 2011. The focus was on academic staff members with doctoral degrees because they play an essential role in the production of research. Permanent academic staff in the qualifications category should be the major producers of research outputs and (at input level) the main supervisors of doctoral students. Based on work across South Africa, the HERANA project proposed that a target of academic staff with doctoral qualifications should be at least 50% of permanent staff, given that all eight universities aimed to be active producers of high-level research. The data in Figure 2.1 show that only three of the eight universities (Botswana, Cape Town and Ghana) had proportions of 50% or above of permanent academic staff with doctorates in 2011. The overall average for the eight universities improved from 40% in 2007 to 43% in 2011. Only Eduardo Mondlane (17%) continued to have an average well below 40% in that year.

In terms of seniority of staff, senior academics were regarded as 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 those leading research groups, should ideally be either professors or associate professors. The junior academics category can provide a sense of what proportion of the permanent academic staff of a university might not be sufficiently qualified to become research leaders. Staff from this group would typically be pursuing personal research agendas designed to improve qualifications, such as doctoral programmes.

Figure 2.2 shows that in 2011, 40% of the staff at the University of Cape Town was in the senior category (meaning professors or associate professors). Apart from Cape Town, only

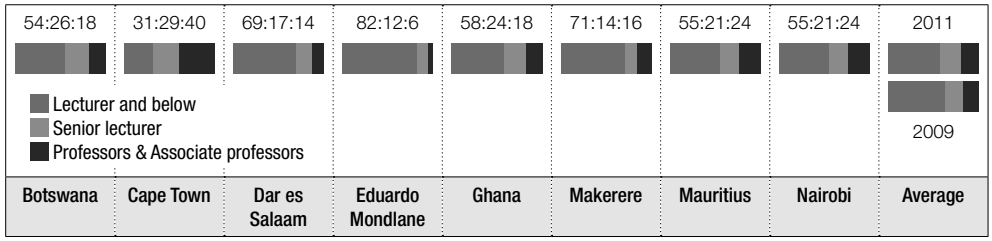
Mauritius (24%) and Nairobi (24%) were above 20% in this category. At the opposite end, and with the exception of Cape Town (31%), junior staff (lecturers and below) exceeded 50%, with Eduardo Mondlane at 82%, Makerere at 71% and Dar es Salaam at 69%. Dar es Salaam, Eduardo Mondlane and Makerere also had very low percentages of senior lecturers (below 20%).

Figure 2.1 Proportion of FTE academics with doctoral degrees (2011) (%)



Source: Bunting et. al (2014b)

Figure 2.2 Academic staff by seniority (2011) (%)

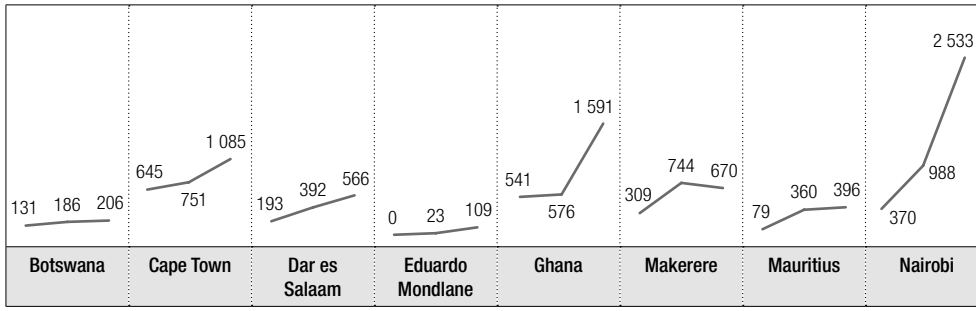


Source: Bunting et. al (2014b)

In terms of postgraduate knowledge outputs, Figure 2.3 shows that the masters graduate total of the eight universities increased from 2 268 in 2001 to 7 156 in 2011, at an average annual rate of 12% over the period. Two universities were responsible for 66% of the overall increase of 4 888 in 2011 compared to 2001: they were Nairobi, where the masters graduate total increased almost sevenfold from 370 in 2001 to 2 533 in 2011, and Ghana, where the masters graduate total almost trebled from 541 in 2001 to 1 591 in 2011.

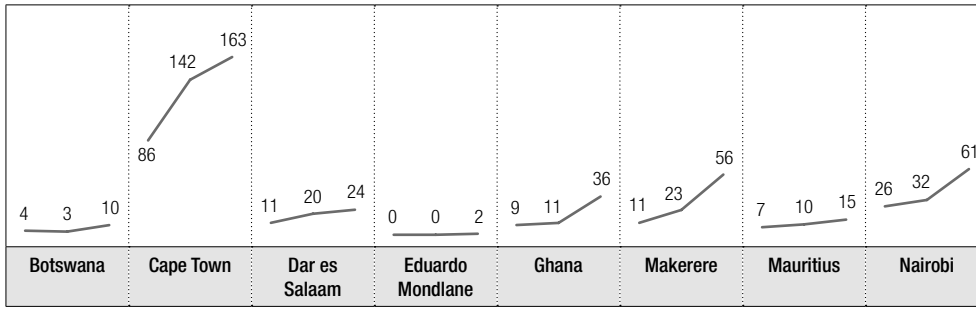
Figure 2.4 summarises the number of doctoral graduates in 2001, 2007 and 2011. The doctoral graduate total across the eight universities increased from 154 in 2001 to 367 in 2011. Collectively, Cape Town, Nairobi and Makerere produced 80% of the doctoral graduate total in 2001, 82% in 2007 and 76% in 2011.

Figure 2.3 Masters graduates (2001, 2007, 2011)



Source: Bunting et. al (2014b)

Figure 2.4 Doctoral graduates (2001, 2007, 2011)

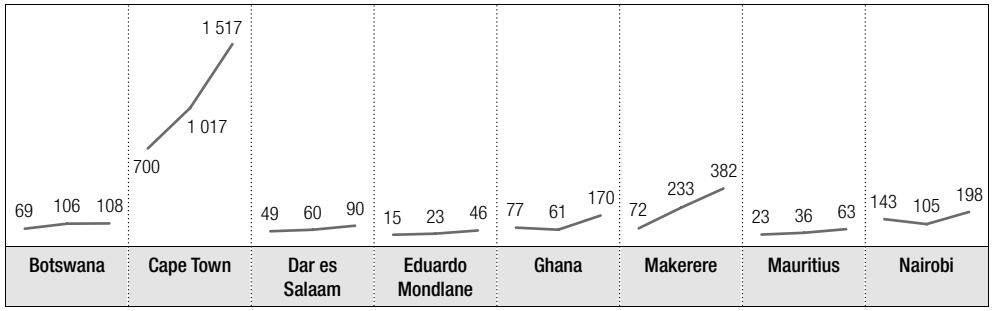


Source: Bunting et. al (2014b)

Figure 2.5 summarises the number of research articles produced by the eight universities. It shows that the combined output doubled from 1 148 research articles in 2001 to 2 574 in 2011.

Figure 2.5 also shows that, as in the case of doctoral graduates, the output of research articles was dominated by Cape Town, Nairobi and Makerere. These three universities produced 80% of the overall research article total in 2001 and 81% in 2011. In 2011, Cape Town produced 1 517 ISI peer-reviewed articles, while the other seven institutions combined produced 1 057. Nonetheless, Cape Town is not very productive in international terms; for example, the most productive university in Latin America, the University of Sao Paulo in Brazil, produced 8 200 ISI publications in 2010 (Badsha & Cloete 2011).

Figure 2.5 Research articles (2001, 2007, 2011)

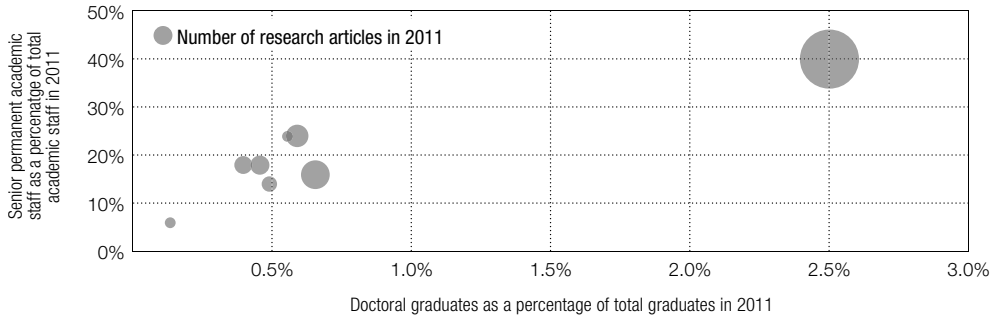


Source: Bunting et. al (2014b)

The combination of low proportions of senior academic staff (as indicated at six institutions being below 20%) with having fewer than 50% of staff with doctorates (as shown for six of the eight universities) can be expected to have a negative effect on knowledge production. Figure 2.6 shows how, at certain universities, a low percentage of senior academic staff (y-axis) combined with a low percentage of doctoral graduates (x-axis) was associated with low knowledge output in the form of research articles.

Figure 2.6 Senior academic staff and doctoral graduates as predictors of publication output

University	2011		
	Doctoral graduates as % of total graduates	Senior academic stass as % of total staff	Research articles
Botswana	0.40%	18%	125
Cape Town	2.51%	40%	1 402
Dar es Salam	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
Mairobi	0.59%	24%	186



Source: Bunting et. al (2014b)

Analysis shows that the groups of staff who would be expected to be active in research (those with doctorates 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 whether 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 affect the output of staff who have doctorates but who are at levels of senior lecturer and below. The administrative and teaching workloads of senior academics, along with a lack of research funding, may contribute to low productivity amongst senior academics at six of the eight universities. This is an area requiring further research.

Conclusion

A review of the mission statements of the eight HERANA universities shows that two of the flagship goals were to engage in high-quality research and scholarship, and to deliver knowledge products which would enhance national and regional development. The results presented above suggest that Cape Town is the only university in this group which clearly satisfies these goals, and that Makerere is the university which comes closest to Cape Town.

Some key problems which emerge from this study are that, relative to their undergraduate student bodies, the institutions enrol low proportions of postgraduate students at masters and doctoral levels. In 2011, 88% of all enrolments across the eight universities were undergraduates, with only Cape Town under 70%. Furthermore, masters programmes overall seem to be focused on professional capping degrees, rather than on training for high-level research. This results in low numbers of masters graduates moving on to doctoral studies. Additionally, the staff complements of seven universities (excluding Cape Town) consist of high proportions of junior, underqualified academics, resulting in low numbers of potential research leaders. Many of the senior, well-qualified staff appear to be promoted to administrative rather than research positions. There is clearly a need for more senior (professorial) positions and research leaders with PhDs in the African flagship universities.

The university remains, despite sometimes strident claims to the contrary, the best and, in most contexts, the only producer of self-renewing, knowledge-producing capacity, meaning research-based PhDs (Gibbons et al. 1994). The adjunct institutions of the knowledge economy are dependent upon a vibrant university sector from which they draw their self-renewable, knowledge-generative capacity (i.e. new PhDs) without which they cannot produce new knowledge. Currently, a vibrant secondary knowledge production landscape only occurs successfully in countries that have a stable PhD-producing university sector – and these countries are mostly in the developed North. In general, the African universities are not strengthening their self-generative capacity and are thus struggling to make a substantial contribution to either new knowledge generation or the application thereof.

Building on the statements of Kofi Annan and the declaration by African Union Ministers of Education at the UNESCO World Conference, the Chairperson of the African Union Commission, Dr Nkosazana Dlamini-Zuma, declared at the 20th anniversary of South Africa's transition to democracy and the 50th anniversary of the African Union that these contexts provide an environment in which discussions on how Africa can propel its future development could take place. She also asserted that universities – and particularly research universities – will enable Africa to grow its prosperity for the next 50 years (Makoni 2014). Moving beyond statements of intent, which in themselves are a major step forward in the African context, it is necessary to gain a much better research-based understanding of the characteristics of research universities, particularly in a developing country context, while simultaneously working on building the infrastructure and the academic environment needed to support emerging research universities in Africa.

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CHAPTER 3

ASSESSING THE PERFORMANCE OF AFRICAN FLAGSHIP UNIVERSITIES

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The academic core

In the preceding chapter on research universities (Chapter 2), it was argued that Africa needs universities that can produce both highly-skilled labour forces and new knowledge. Both products are essential to the creation of national economies that are globally competitive. The chapter argued further that these African universities would not need to be world-class research universities. It made the following main points about applications of the notion of 'world-class research universities':

- Research universities are relatively small proportions of most university systems. For example, in China 3% of universities are classified as research universities, and in the United States the proportion is 5%. Many smaller developing countries have only a single research university.
- The linking of world-class to major international ranking systems stimulated a fascination with prestige/status that was completely beyond the realities of most African universities. Only five African universities (four of them in South Africa) were placed in the top 500 by these ranking systems.
- An important consequence of discussions on 'world-class research universities' has been an increased awareness of performance and the measurement of performance, particularly in the area of knowledge production.

While a consequence of rankings has been an increased awareness of performance, particularly with regard to knowledge production, the global rankings (and especially the Academic

Ranking of World Universities)[1] offer no useful methodology or indicators for institutional improvement. Instead, these rankings – and particularly those at the top end – seem to solidify existing performance and status.[2]

As such, the Higher Education Research and Advocacy Network in Africa (HERANA) project elected to explore the 'academic core' notion referred to in Chapter 2. The university's unique contribution to development is via knowledge – either transmitting knowledge (teaching) to individuals who will go out into the world and contribute to society in a variety of ways, or producing and disseminating knowledge (research, engagement) that can be applied to the problems of society and economy. Part of our conceptual framework for understanding what impacts on a university's ability to make a sustainable contribution to development focused on the nature and strength of its knowledge-producing activities. According to Burton Clark (1998), when an enterprising university evolves a stronger steering core and develops an outreach structure, its heartland is still in the traditional academic departments, formed around disciplines and some interdisciplinary fields. The heartland is where traditional academic values and activities such as teaching, research and training of the next generation of academics occur. Instead of 'heartland', we use the concept 'academic core'. According to our analytical assumption, it is this core that needs to be strengthened if a university, as a key knowledge institution, is to contribute to development (Cloete 2012). While most universities also engage in knowledge activities in the area of community service or outreach, our contention is that the backbone or the foundation of the university's business is its academic core; that is, its teaching via academic degree programmes, its research output, and the production of doctorates (those individuals who, in the future, will be responsible for carrying out the core knowledge activities).

In Chapter 2, Cloete et al. use the term 'flagship' to describe the eight African universities included in the HERANA study.[3] The first reason for the choice of the term 'flagship' was that all of these institutions (except for Cape Town) are each the 'mother university' of a newly independent country. The University of Cape Town is South Africa's oldest university and is also the highest-ranked university in the country and in Africa.[4] The second reason for classifying these eight universities as flagships is that they took themselves to be leading knowledge-producing institutions, and at the same time to be institutions making major contributions to research and development in their countries. But, as was pointed out in Chapter 2, some of the HERANA participants also use the term 'research universities'.

The self-perceptions or aspirations of the eight universities are contained in their vision and mission statements, which indicate that each aims to be a centre of academic excellence that is engaged in high-quality research and scholarship, and a producer of high-level knowledge

1 Academic Ranking of World Universities website: http://www.shanghairanking.com/ARWU2014.html.

2 In a chapter in a forthcoming (2015) book by John Douglass (*Exploring the Flagship University Model: Altering the paradigm from ranking to relevancy*, Palgrave Macmillan), the issue of ranking versus relevance will be addressed in greater detail.

3 The universities of Botswana, Cape Town, Dar es Salaam, Eduardo Mondlane, Ghana, Mauritius, Makerere and Nairobi.

4 Academic Ranking of World Universities: http://www.shanghairanking.com/ARWU2014.html.

that will satisfy national and regional development needs. These vision and mission statements are more than just expressions of institutional aspiration. The aims built into the statements determine the academic core of each university; that is, the combination of their teaching and research programmes, their academic staffing resources, and their research and doctoral graduate outputs. For the purposes of this chapter, the academic core of a flagship university will be taken to consist of the following elements, which are related to the broad aims summarised above:

- The inputs required for it to achieve the goal of being a centre of academic excellence;
- The student graduate outputs expected of a centre of academic excellence; and
- The high-level knowledge outputs (doctoral graduates and research publications) expected of a centre of academic excellence.

The references to requirements and expectations again raise a point made earlier about the measurement of performance playing an increasingly important role in discussions about flagship universities: it is not sufficient simply to lay down the key aims of flagship universities; some attempt must be made to assess the performance of the universities relative to these aims.

The main purpose of this chapter is that of describing and explaining the steps that the HERANA project has taken in developing a methodology for assessing the performance of the eight flagship universities. This developing methodology will make use of both the aims built into the academic cores of these universities and the empirical data presented in the previous chapter.

First attempts to link academic core and institutional assessment

The HERANA project raised the issue of using the academic core as a basis for institutional assessment in a paper entitled *The Academic Core, Data and Indicators* (Bunting 2011). This paper had been offered at a workshop which the Centre for Higher Education Transformation (CHET) organised in Stellenbosch, South Africa in October 2011. The paper discussed the collecting of common sets of data, the construction of academic cores, and the possibility of making cross-national assessments of universities in Africa. The paper included analyses of the eight flagship universities, to which reference is made in Chapter 2 of this book on research universities. This paper took as given these two principles:

- Any assessment of performance must be relative to a set of goals and targets that a university is expected to achieve; and
- A cross-national performance measurement system must be based on common goals and on a common set of quantitative targets linked to these goals.

It maintained that the development of these two principles should begin with examinations of the aspirations of the universities, as these appear in their publicly available vision and mission statements. These aspirations, the paper argued, can be unpacked into sets of input and output goals that are essential components of their academic cores. Table 3.1 lists the input and output goals and the related targets that were used in 2011.

Table 3.1 2011 proposals on goals and targets for flagship universities

Academic core goals	Targets related to goals
Input goal 1: Strong enrolments in SET	40% of student enrolments to be in SET programmes
Input goal 2: Strong postgraduate enrolments	15% of student enrolments to be in masters and doctoral programmes
Input goal 3: Favourable student-to-academic staff ratios	Ratio of FTE students-to-FTE academics to be below 20
Input goal 4: High proportion of academic staff with doctoral degrees	50% of permanently-appointed academics to have doctoral degrees
Input goal 5: High levels of research funding	Research funding per permanent academic to be 20 000 purchasing power parity dollars
Output goal 6: High outputs of graduates in SET fields	20% of total SET enrolments in any given year should graduate
Output goal 7: High outputs of doctoral graduates	15% of total doctoral enrolments in any given year should graduate
Output goal 8: High levels of new knowledge production	Ratio of peer-reviewed research articles per permanent academic to be 0.50 per annum

The paper used empirical data for 2001–2007 that had been collected during 2010 to relate institutional performance to the targets listed in Table 3.1 above. Examples of the results of this linking of data to targets can be seen in Table 3.2, which uses the following three-point scale in assessing performance relative to target: 3 = strong; 2 = medium; 1 = weak.

The representatives of the flagship universities present at the October 2011 workshop expressed concerns about the use of the above three-point scale. Their views were that measurements of performance relative to goals and targets should not result in value judgements of the kind contained in the assessment columns of Table 3.2. Performance reviews, they insisted, should at best be institutional self-assessments in which a university first compares its data averages with those of a group of universities which it has itself selected, and then decides what, if any, internal action is needed.

This phase of the cross-national project was summed up in the book *Cross National Performance Indicators: A case study of eight African universities* (Bunting & Cloete 2012). This book dropped Table 3.2 and gave detailed examples of how universities could compare

themselves to other selected groups of flagship universities. An example of this book's institutional-level analyses appears as Table A3.1 in the Appendix. As can be seen, Table A3.1 does not offer any evaluations of Botswana's performance relative to the goals and targets of a flagship university. The table is, within the framework of the cross-national performance indicator project, an unsatisfactory one. It simply compares Botswana to a number of other small flagship universities and allows supposedly non-evaluative comments of the following kind to be made:

- Goal 1: Botswana's proportion of SET enrolments is about half of the target and half of the scores of the other three small universities;
- Goal 2: Botswana's proportions of masters and doctoral enrolments are below target, but consistent with two of the other three small universities; and
- Goals 7 and 8: Botswana's high-level knowledge output rates are, like those of the other three small universities, below the target levels.

Table 3.2 Assessing two universities on 2011 goals and targets

GOALS	Target	Cape Town		Makerere	
		Data average: 2001–2007	Assessment	Data average: 2001–2007	Assessment
Goal 1: Proportion of enrolments in SET	40%	41%	3 = Strong	24%	1 = Weak
Goal 2: Masters + doctors enrolments as % of total enrolments	15%	19%	3 = Strong	5%	1 = Weak
Goal 3: Student-to-academic staff ratios	Below 20	13	3 = Strong	16	3 = Strong
Goal 4: Academic staff with doctoral degrees	50%	48%	3 = Strong	32%	1 = Weak
Goal 5: Research funding per academic in purchasing power parity dollars	20 000	47 700 (2007 only)	3 = Strong	4 900 (2007 only)	1 = Weak
Goal 6: Ratio of graduates to enrolments in SET fields	20%	21%	3 = Strong	20%	3 = Strong
Goal 7: Doctoral graduates per permanent academic	0.15	0.15	3 = Strong	0.02	1 = Weak
Goal 8: Research publications per permanent academic	0.50	0.95	3 = Strong	0.09	1 = Weak
Average assessment		3 = Strong		1.5 = Medium/weak	

In November 2012, CHET held a further workshop with the eight flagship universities in Cape Town. The main aims of this workshop were to highlight the improved quality of the data produced by the flagship universities for the academic years 2009–2011, and to show that the new data sets would permit changes to be made to the flagship goals and targets listed in

Table 3.1. One of the papers at the workshop, *Developing Academic Core Indicators* (Bunting 2012), proposed that Goal 5 of Table 3.1 should be deleted because of problems experienced in collecting consistent data on research funding. It proposed further that two new input goals should be added to raise the total of flagship goals to nine. The paper proposed finally that the number of targets related to the flagship goals should increase from the eight targets in Table 3.1 to 16.

This proposed expansion of goals and targets in the academic core of flagship universities was not accepted by the November 2012 workshop. The main concern expressed was that the result of adding additional goals and targets to the academic cores of these universities could only result in more complex versions of Table A3.1 being produced. Table A3.2 in the Appendix, a shortened version of the full November 2012 table, offers an example of this. All that this truncated table succeeds in doing is to show, for the three selected universities, which targets were met and which were not. No individual or overall assessment of the performances of the universities is offered in the table. It thus became clear after this November 2012 workshop that merely adding new goals and targets to the academic core of the flagship universities would not be an acceptable methodology for a study of cross-national performance indicators. A return would have to be made to the basic methodology of Table 3.2, which had used a rating scale when evaluating a university's actual performance relative to targets set. The rating scale used in Table 3.2 would, however, have to be re-examined, as would the actual goals and targets of the academic core.

In the sections that follow, a methodology-based revised Table 3.2-type is outlined. This approach makes use of academic core models that have become embedded in policies adopted by government for the South African university system.

Flagship universities as traditional universities

After a series of mergers between 2002 and 2007, South Africa was forced to revise its policies on the structure of the higher education system. In 2002, this higher education system consisted of a total of 36 institutions, with 21 described as universities and 15 as technikons. The mergers involved university-university, university-technikon and technikon-technikon amalgamations, and had the effect of reducing the higher education total to 23 institutions. This total became 25 in 2014 with the opening of two new, but small, universities. Three policy outcomes flowed from the mergers: the description 'technikon' was dropped, and all higher education institutions were described as 'universities' but had then to be placed into different academic core categories. The categories currently employed in South Africa's higher education system are these:

- Traditional universities, whose focus must be on general formative academic programmes (e.g. humanities, life and physical sciences, mathematical sciences) and on professional academic programmes that prepare graduates for entry into a profession

(e.g. medicine, law, accounting, engineering);
- Universities of technology, whose focus must be on vocational programmes which prepare students for careers at levels below those of the professions; and
- Comprehensive universities, which must offer a mix of the programmes offered by traditional universities and the universities of technology.

This requirement that the three categories of university must have different academic core requirements was discussed in a paper offered at a CHET workshop on institutional differentiation, held in Stellenbosch in October 2014. The paper, *Academic Core Indicators as Mechanisms for Differentiation* (Bunting 2014), used the following basic arguments:

- The academic cores of South African universities can be expressed as mandates that prescribe what a university is empowered by government to do and which outputs government expects it to deliver;
- These mandates and expected outputs can be expressed as a limited number of goals that can be linked to quantitative targets;
- Quantitative measures can be made of the extent to which individual institutions comply with their category's quantitative goals and targets; and
- The performance of individual institutions can be measured relative to the extent to which they achieve the targets that have been set.

Appendix Table A3.3 sets out an account, in a form similar to the listing of academic core goals and targets in Table 3.1, of what the mandates and targets should be of South Africa's 11 traditional universities. These mandates have been derived primarily from the 2013 *White Paper for Post-School Education and Training* (DHET 2013). Table A3.4 in the Appendix sets out, again in a form similar to Table 3.1, the output targets which South Africa's traditional universities are expected to achieve. These targets have been derived from various government policy and funding documents.

The mandates and output targets of South Africa's category of traditional university can be readily adapted for use in performance assessments of the flagship universities. The data submitted by the flagship universities for 2009–2011 generate a table that misses only the first mandate target on academic programmes in Table A3.3 in the Appendix, and the undergraduate success rate targets that appear in Table A3.4. These two targets rely on detailed extracts from the South African national Higher Education Management Information System, which could not be replicated in the data collections from the flagship universities.

The goals and targets that have been extracted from Tables A3.3 and A3.4 in the Appendix for use in the assessment of flagship universities are listed in Table 3.3.

Appendix Table A3.5 sets out, for the three-year period 2009–2011, the flagship universities' data averages for the 13 targets listed in Table 3.3. The principle of relating data averages to targets, which was used in Table 3.2, can be applied here. The simple three-point

scale employed in 2011 will not, however, be used again because it had no direct link to institutional data averages; it was in effect a value judgement based on a perceived distance between the data averages and their related numerical targets. The new methodology requires mechanical calculations to be made, and these must lead to the data averages in Table A3.5 for each university and the averages for all eight being converted to positions on a four-point scale. The calculations must be based on this formula: (data average *x* 4) divided by (target for traditional university).

Table 3.3 Goals and targets for flagship universities

Goals	Targets
Student enrolments must be primarily in major fields of study in SET	(1) Science and technology enrolment proportion to be at least 40%
Student enrolments must be primarily in undergraduate programmes, but with strong proportions in masters and doctoral programmes	(2) Masters + doctors enrolment proportion to be at least 20%
	(3) Doctors enrolment proportion to be at least 5%
A high proportion of permanent academic staff members must be in senior rank categories	(4) At least 60% of permanent academic staff to be in ranks of professor, associate professor or senior lecturer
Permanent academic staff members must be well-qualified	(5) At least 50% of permanent academic staff to have doctoral degrees
Student-to-academic staff ratios must be favourable and able to support the institution's teaching/learning activities	(6) Ratios of FTE students-to-FTE academics in science and technology to be at most 20:1
	(7) Ratios of FTE students-to-FTE academics in all other fields to be at most 25:1
High outputs of total graduates and of graduates in SET fields	(8) Total graduates in given year to be at least 25% of total enrolments in that year
	(9) SET graduates as % of total graduates to match SET enrolments as % of total enrolments
High outputs of masters and doctoral graduates	(10) Total masters graduates in given year to be at least 25% of masters head count enrolments in that year
	(11) Total doctoral graduates in given year to be at least 15% of doctoral head count enrolments in that year
High levels of new knowledge production by academic staff	(12) Ratio of research publications to permanent academic staff to be at least 1.0
	(13) Ratio of doctoral graduates to permanent academic staff to be at least 0.20

Table 3.4 sums up the results of calculations that apply the above formula to the data averages in Table A3.5. It should be noted that the maximum score allocated to a university or to an average is 4.0, even if the calculation yields a result above 4.0. For example, the application of the formula converts the University of Cape Town's average of 63% for permanent academics with doctorates (against the target of 50%) to 5.04, which is rounded down to 4.0. Makerere University's average of 31% for permanent academics with doctorates results in a score of 2.5 on this four-point scale.

The numerical values in Table 3.4 can be read in these broad ways:

- Score of 4 = has met target for specific goal;
- Score of between 3.0 and 3.9 = close to target;
- Score between 2.0 and 2.9 = performance below target; and
- Score below 2 = well below target.

Table 3.4 Indicator scores: Relating data averages to targets on a four-point scale

	Botswana	Cape Town	Dar es Salaam	Eduardo Mondlane	Ghana	Makerere	Mauritius	Nairobi	Average for eight flagships
F1: SET enrolments as % of total enrolments	2.2	4.0	1.9	4.0	2.3	3.6	4.0	2.8	**3.3**
F2: Masters + doctoral students as % of total enrolment	1.7	4.0	2.2	1.0	1.8	1.2	1.9	3.8	**2.2**
F3: Doctoral students as % of total enrolments	0.3	4.0	0.4	0.1	0.5	1.1	0.4	0.3	**0.9**
F4: Senior academics as % of total permanent academics	2.9	4.0	2.3	1.2	4.0	2.0	3.1	3.2	**3.1**
F5: % academics with doctoral degrees	4.0	4.0	3.9	1.1	4.0	2.5	3.3	3.6	**3.6**
F6: Ratio of SET FTE students to SET academics	4.0	4.0	4.0	4.0	4.0	4.0	3.9	4.0	**4.0**
F7: Ratio of other FTE students to other academics	4.0	4.0	4.0	4.0	1.7	2.3	3.9	1.4	**2.8**
F8: Average ratio of total graduates to total enrolments	2.9	4.0	4.0	1.1	3.2	4.0	3.9	2.6	**3.5**
F9: % SET graduates to = % SET enrolments	2.9	3.3	3.5	2.0	3.8	3.9	3.5	3.4	**3.2**
F10: Ratio of masters graduates to total masters enrolments	2.3	3.9	4.0	1.0	4.0	4.0	4.0	2.2	**4.0**
F11: Ratio of doctoral graduates to total doctoral enrolments	3.8	4.0	4.0	1.0	2.6	2.7	4.0	4.0	**3.9**
F12: Ratio of research publications per academic	0.6	4.0	0.4	0.1	0.6	1.1	0.7	0.6	**1.2**
F13: Ratio of doctoral graduates per academic	0.2	3.5	0.4	0.0	0.5	0.8	0.9	0.6	**0.9**

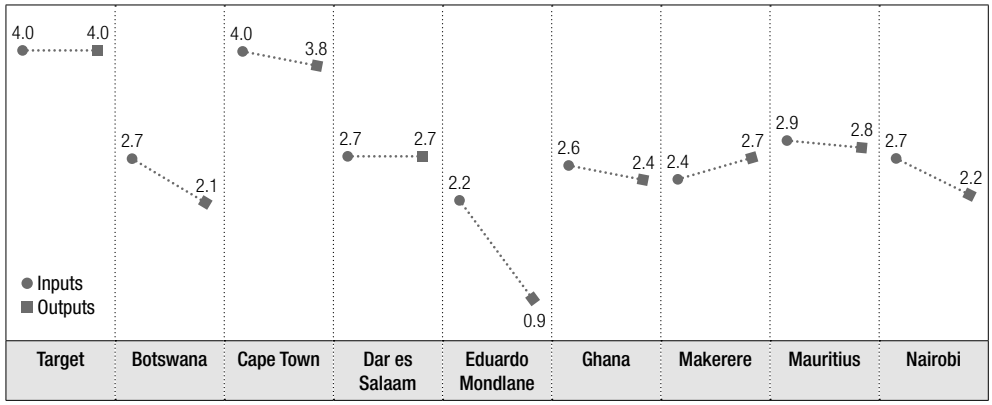
Compiled by Ian Bunting

Figure 3.1 summarises the indicator scores in Table 3.4 in terms of averages for input targets (F1 to F7) and averages for the output targets (F8 to F13). These scores reflect the impact of taking the eight flagship universities to be traditional universities in the South African sense.

The graph suggests that only Cape Town was able to meet the flagship targets that had been adapted from those for South African traditional universities. The averages for the other seven universities were all below the targets set for flagship universities. The output averages do, however, suggest that the eight universities could be divided into the following four clusters:

- Meets the targets: Cape Town;
- Close to targets: Mauritius, Dar es Salaam, Makerere;
- Below targets: Ghana, Nairobi, Botswana; and
- Well below targets: Eduardo Mondlane.

Figure 3.1 Performance against targets: Input and output averages for the flagship universities



Compiled by Ian Bunting

The data averages offered in Figure 3.1 are too broad to indicate what the actual strengths and weaknesses of the universities are within these four clusters; in other words, this graph cannot function as a diagnostic tool. A different and more detailed set of graphs is needed to reflect institutional performances in relation to all 13 of the flagship targets.

A further point that must be noted is that the four clusters depend on the averages for the three-year period 2009–2011 which appear in Table A3.5 in the Appendix. These averages obviously cannot reflect changes that may have occurred in the data of a university over a period of time. To enable a picture to be offered of changes in data over time, a set of eight tables (Tables A3.6 to A3.13) have been included in the Appendix. The data in these tables cover the five-year period 2007–2011 and deal with:

- Masters student enrolments and graduates;
- Doctoral student enrolments and graduates;
- Totals of permanent academic staff members employed;
- Numbers and proportions of academic staff members with doctoral degrees; and
- Totals of research articles published.

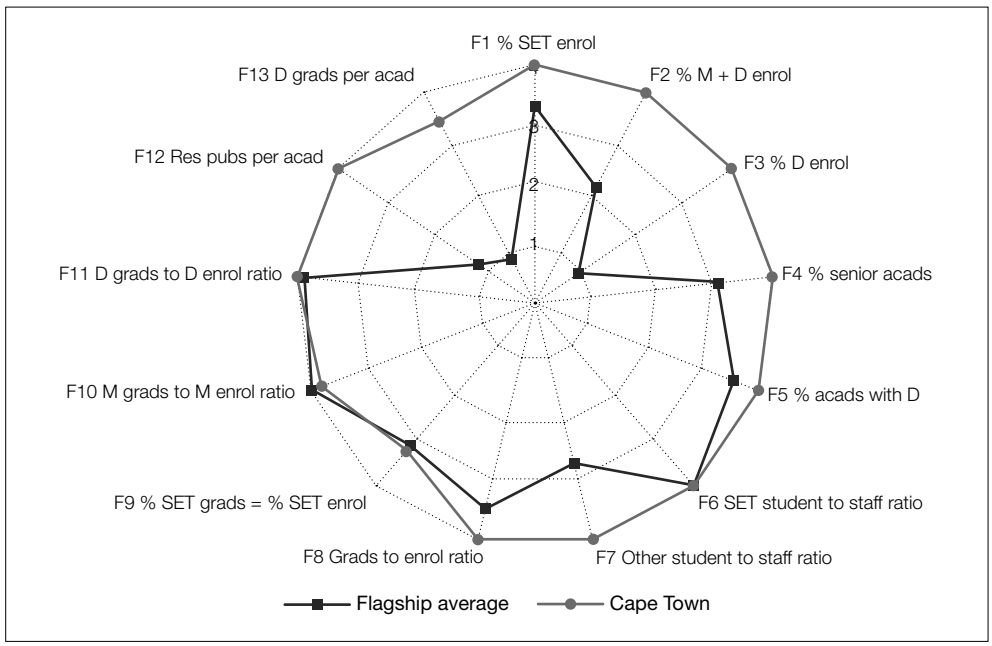
References to these data tables will be made in the notes to the discussions in the next section on the radar graphs for each of the flagship universities.

Radar graphs as diagnostic tools

The indicator scores in Table 3.4 can be represented as radar graphs that show the extent to which each flagship university has met the target in the final column of this table, and at the same time show how that performance compares to the average for all eight flagship universities. These graphs can serve as diagnostic tools for institutional planners and information specialists. The radar graphs of the eight flagship universities, together with notes, comments and references to tables in the Appendix, are presented below.

Figure 3.2 shows that, during the three-year period 2009–2011, Cape Town met 11 of the 13 flagship targets and performed consistently above the averages of the eight flagship universities. The two possible weaknesses in Cape Town's performance were in its throughputs of SET graduates (target F9) and of doctoral graduates (target F13). In the case of target F9, SET graduates as a proportion of total graduates did not match SET's proportion of total enrolments. In the case of target F13, Cape Town's throughput of doctoral graduates reflected possible inefficiencies in its throughput rates. The data in Tables A3.8 and A3.9 in the Appendix show that Cape Town's growth in doctoral enrolment was slightly higher than its growth in doctoral graduates.

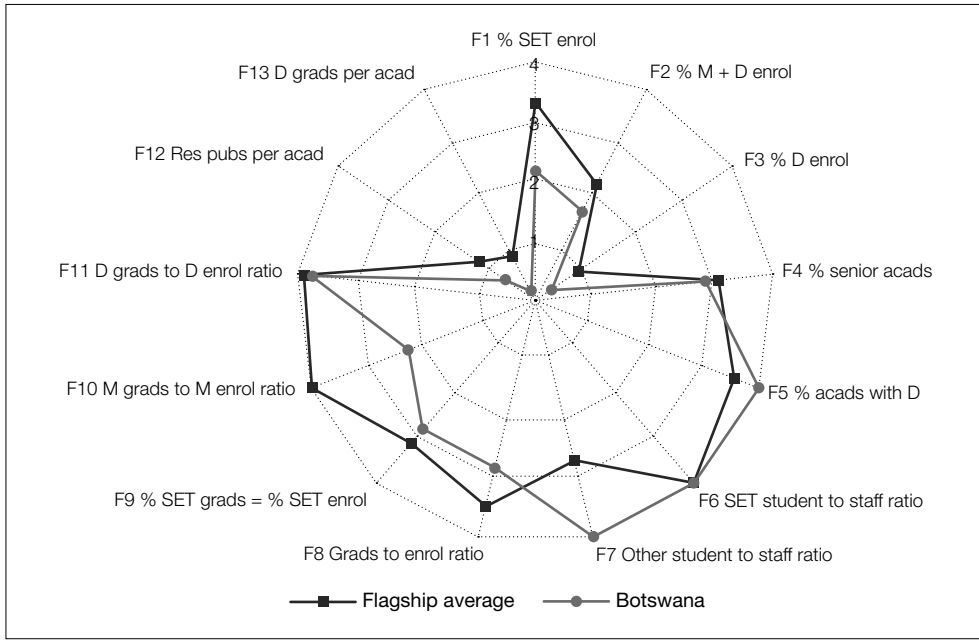
Figure 3.2 University of Cape Town (2009–2011)



Compiled by Ian Bunting

Figure 3.3 shows that Botswana met four of the 13 flagship targets. These related to its high proportion of academics with doctoral qualifications (target F5); its favourable ratios of FTE student-to-academic staff (targets F5 and F6); and its throughput rate of doctoral graduates (F11).

Figure 3.3 University of Botswana (2009–2011)



Compiled by Ian Bunting

Botswana had eight major weaknesses over the period. On the input side, its proportions of SET student enrolments (target F1), of masters plus doctoral students (target F2) and of doctoral students (target F3) were below the flagship target as well as below the average for the eight flagship universities. On the output side, its weaknesses, which resulted in scores below the flagship targets as well as the flagship averages, were its throughputs of total graduates (target F8), of SET graduates (target F9), of masters graduates (target F10), as well as its outputs per academic of research publications (target F12) and of doctoral graduates (target F13).

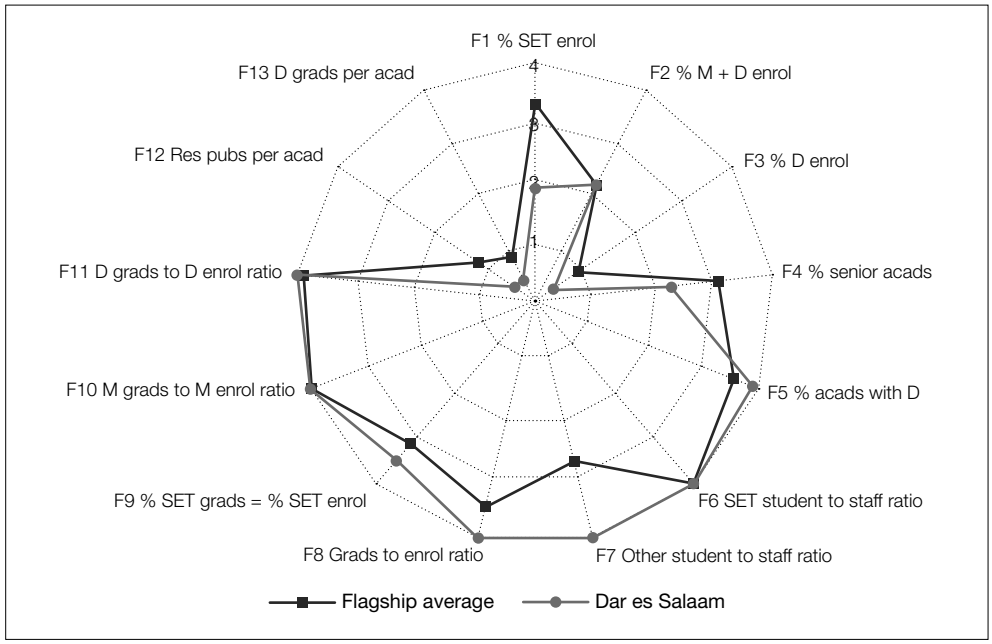
The Appendix Tables set the five-year context (2007–2011) for some of the areas in which Botswana has appeared to be weak:

- Growth in enrolments at masters as well as doctoral levels was moderate. Masters enrolments grew from 951 in 2007 to 1 254 in 2011 (an increase of 303 or 185%). Doctoral enrolments grew from 41 in 2007 to 54 in 2011 (an increase of 13 or 32%) (Tables A3.6 and A3.8).

- The total of permanent academics fell from 767 in 2007 to 744 in 2011 (a drop of 23 or 3%). The total of academics with doctorates did however increase from 299 in 2007 to 484 in 2011 (an increase of 184 or 62%).
- Doctoral graduate totals were low and increased from 3 in 2007 to 10 in 2011 (Table A3.9).
- Research publication totals also remained low, relative to the numbers of academic staff employed, and increased from only 106 in 2007 to 108 in 2011 (Table A3.13).

Figure 3.4 shows that Dar es Salaam met six of the 13 flagship targets. These related to its proportion of academics with doctorates (target F5); to its favourable FTE student-to-academic staff ratios (targets F6 and F7); and to its throughput rates of total graduates and of masters and doctoral graduates (targets F8, F10 and F11).

Figure 3.4 University of Dar es Salaam (2009–2011)



Compiled by Ian Bunting

Over the period, Dar es Salaam had six main weaknesses, which had the effect of pulling down the averages reflected in Figure 3.1. It had four main input weaknesses. Its proportions of SET students (target F1), of doctoral students (target F3), and of senior academics (target F4) were below the flagship target and below the average for the eight flagship universities. Its input of masters plus doctoral students (target F2) was below the target but matched the average for the flagship universities. Dar es Salaam had two major output weaknesses that were both related

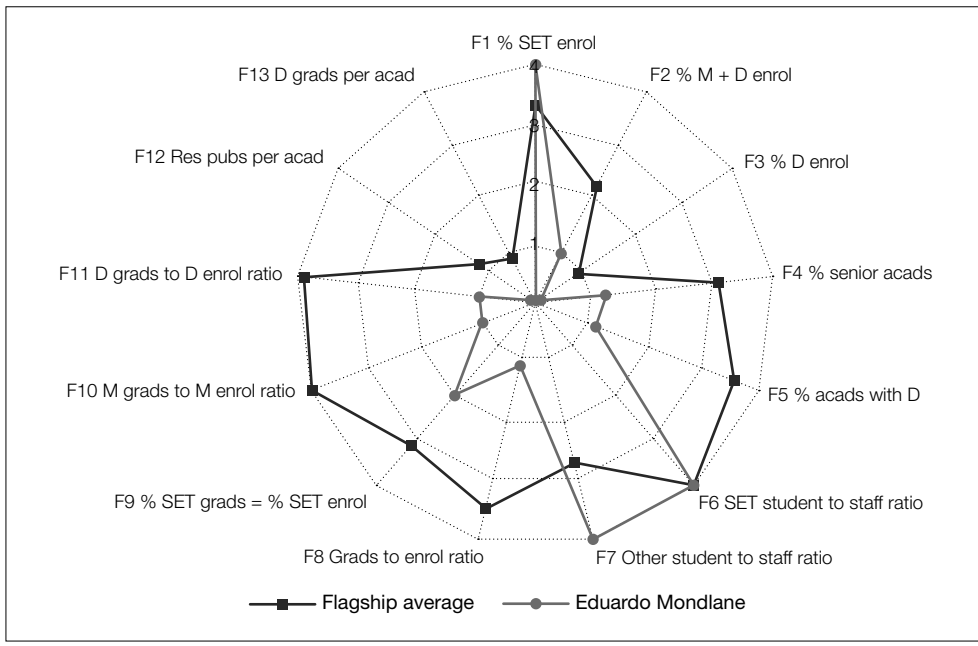
to academic staff outputs. Its outputs of research publications per academic (target F12) and of doctoral graduates per academic (target F13) were both below the flagship target and the averages for the eight flagship universities.

The Appendix Tables set the five-year context (2007–2011) for some of the areas in which Dar es Salaam has appeared to be weak:

- Growth in enrolments at masters was high (44% in 2011 compared to 2007), but enrolments at doctoral level dropped from 190 in 2007 to 128 in 2011 (Tables A3.6 and A3.8).
- The total of permanent academics remained flat (900 in 2007 and 906 in 2011), but the total of academics with doctorates fell by 62 (or 33%) between 2007 and 2011 (Tables A3.10 and A3.11).
- Doctoral graduate totals increased between 2007 and 2011, but remained low at only 24 in 2011 (Table A3.9).
- Research publication totals remained low relative to the numbers of academic staff employed, but did increase from 60 in 2007 to 90 in 2011 (Table A3.13).

Figure 3.5 shows that Eduardo Mondlane met three of the 13 flagship targets. These related to its high proportion of SET enrolments (target F1), and to its favourable ratios of FTE student-to-academic staff (targets F6 and F7).

Figure 3.5 Eduardo Mondlane University (2009–2011)



Compiled by Ian Bunting

Eduardo Mondlane had ten major weaknesses over the period. On the input side, its proportions of masters plus doctoral students (target F2), of doctoral students (target F3), of senior academics (target F4), and of academics with doctorates (target F5) were well below the flagship target and the average for the eight flagship universities. On the output side, its throughputs of total graduates (target F8), of SET graduates (target F9), of masters graduates (target F10), and of doctoral graduates (target F11) were far below the flagship targets and the flagship averages. Its outputs of research publications per academic (target F12) and of doctoral graduates per academic (target F13) were particularly poor, and were the main reasons why Eduardo Mondlane had, in Figure 3.1, an output average below 1.

The Appendix Tables set the five-year context (2007–2011) for some of the areas in which Eduardo Mondlane has appeared to be weak:

- Growth in enrolments at the masters level was high. Masters enrolments grew from 420 in 2007 to 1 295 in 2011 (an increase of 875 or 208%). Doctoral enrolments remained low, growing from 3 in 2007 to 23 in 2011 (Tables A3.6 and A3.8).
- The total of permanent academics grew rapidly from 514 in 2007 to 1 333 in 2011 (an increase of 819 or 159%). The total of academics with doctorates also increased sharply, from 98 in 2007 to 227 in 2011 (an increase of 129 or 132%).
- Doctoral graduate totals were low, with only two being produced in 2011 (Table A3.9).
- Research publication totals also remained low, relative to the numbers of academic staff employed, but did double from only 23 in 2007 to 46 in 2011 (Table A3.13).

Figure 3.6 shows that Ghana met four of the 13 flagship targets. These related to its high proportion of senior academic staff (target F4); its high proportion of academics with doctoral qualifications (target F5); its favourable ratio of FTE student-to-academic staff in SET programmes (target F6); and its throughput rate of masters graduates (target F10).

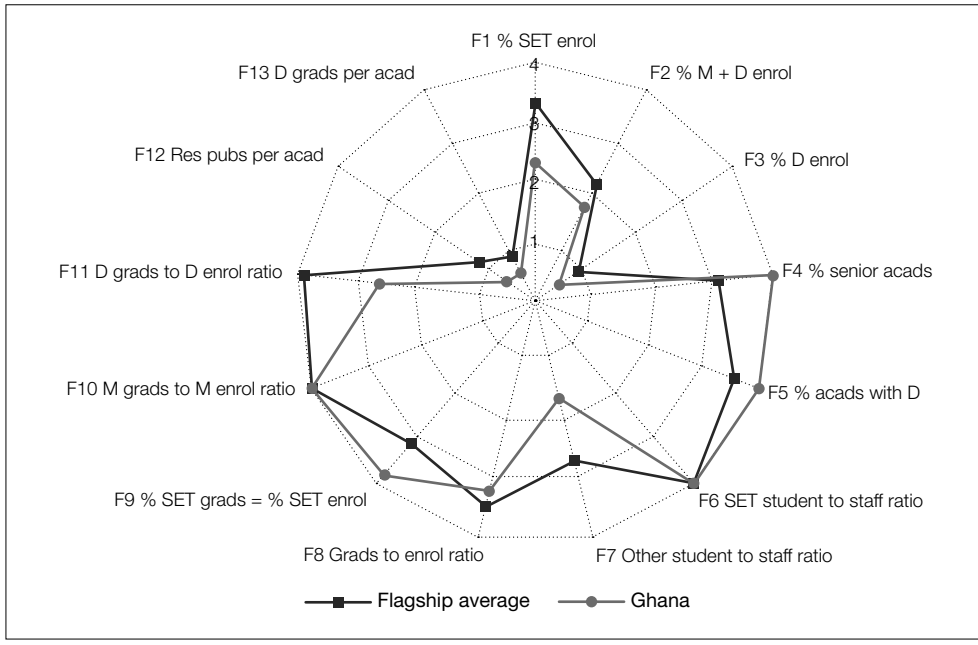
Ghana had six main weaknesses over the period. Its proportions of SET student enrolments (target F1), of masters plus doctoral students (target F2), and of doctoral students (target F3) were below the flagship target and below the average for the eight flagship universities. Other weaknesses that resulted in scores below the flagship targets and the flagship averages were its student-to-staff ratio in programmes other than SET (target F7), its throughput of doctoral graduates (target F11), and its outputs per academic of research publications (target F12) and of doctoral graduates (target F13).

The Appendix Tables set the five-year context (2007–2011) for some of the areas in which Ghana has appeared to be weak:

- Growth in enrolments at both masters and doctoral levels was very high. Masters enrolments grew from 1 503 in 2007 to 4 280 in 2011 (an increase of 2 777 or 185%). Doctoral enrolments grew from 110 in 2007 to 316 in 2011 (an increase of 206 or 187%) (Tables A3.6 and A3.8).

- The total of permanent academics grew from 767 in 2007 to 1 058 in 2011 (an increase of 291 or 38%). The total of academics with doctorates grew from 360 in 2007 to 529 in 2011 (an increase of 169 or 38%).
- Doctoral graduate totals increased between 2007 and 2011, but remained low at only 36 in 2011 (Table A3.9).
- Research publication totals also remained low, relative to the numbers of academic staff employed, but did increase from 61 in 2007 to 170 in 2011 (Table A3.13).

Figure 3.6 University of Ghana (2009–2011)



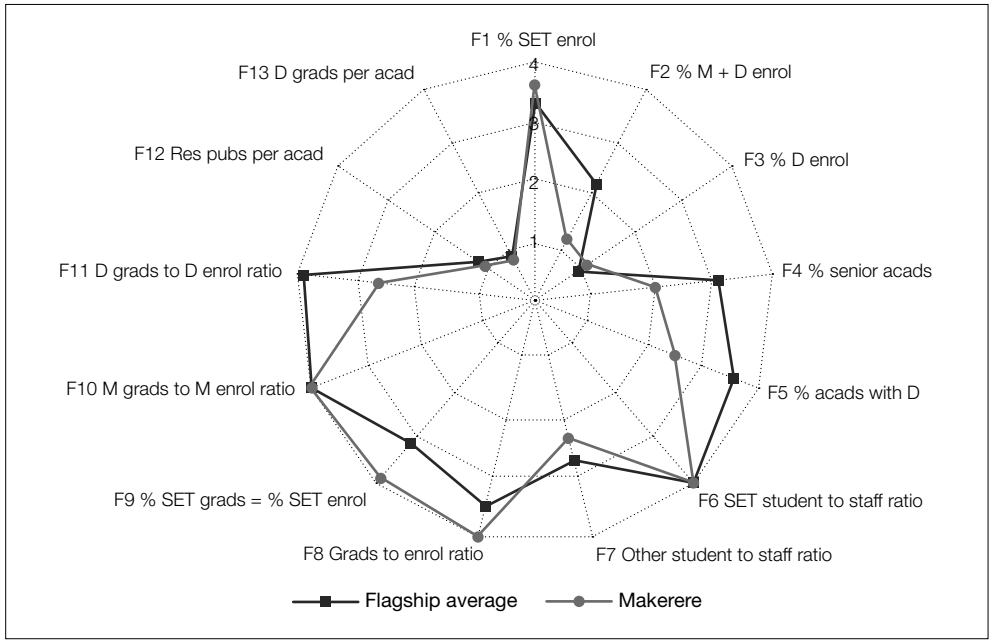
Compiled by Ian Bunting

Figure 3.7 shows that Makerere met four of the 13 flagship targets. These related to its favourable ratio of FTE student-to-academic staff in SET programmes (target F6); its throughput rate of total graduates (target F8); its throughput rate of SET graduates (target F9); and its throughput rate of masters graduates (target F10).

Over the period, Makerere had eight main weaknesses. Its proportions of masters plus doctoral students (target F2) and of doctoral students (target F3) were below the flagship target, and in the case of masters plus doctoral enrolments, below the average for the eight flagship universities. Its performance fell below the flagship target and the average for the eight flagship universities in the cases of the provision of senior academics (target F4) and of academics with doctorates (target F5). Other weaknesses that resulted in scores below the flagship target and

flagship average were its student-to-staff ratio in programmes other than SET (target F7), its throughput of doctoral graduates (target F11), and its outputs per academic of research publications (target F12) and of doctoral graduates (target F13).

Figure 3.7 Makerere University (2009–2011)



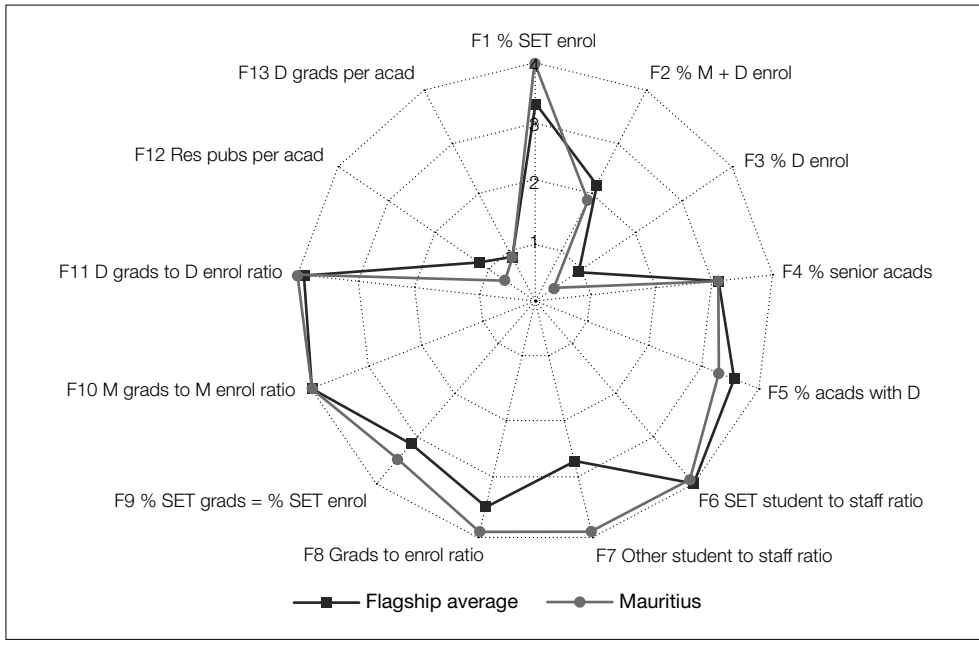
Compiled by Ian Bunting

The Appendix Tables set the five-year context (2007–2011) for some of the areas in which Makerere has appeared to be weak:

- Growth in enrolments at both masters and doctoral levels was very high. Masters enrolments at Makerere grew from 763 in 2007 to 1 705 in 2011 (an increase of 123%). Doctoral enrolments grew from 32 in 2007 to 563 (1 659%) in 2011 (Tables A3.6 and A3.8).
- The total of permanent academics remained flat (1 179 in 2007 and 1 209 in 2011), as did the total of academics with doctorates 365 in 2007 and 375 2011 (Tables A3.10 and A3.11).
- Doctoral graduate totals more than doubled from 23 in 2007 to 56 in 2001.
- Research publication totals have remained low, relative to the numbers of academic staff employed, but did increase from 233 in 2007 to 382 in 2011 (an increase of 149 or 64%) (Table A3.13).

Figure 3.8 shows that Mauritius met three of the 13 flagship targets. These related to its proportion of students in SET (target F1), and to its throughput rates of masters and doctoral graduates (targets F10 and F11). Mauritius came close to meeting three other goals with scores of 3.9 out of 4.0. These were its favourable FTE student-to-academic staff ratios (targets F6 and F7) and its throughput rate of total graduates (target F8).

Figure 3.8 University of Mauritius (2009–2011)



Compiled by Ian Bunting

Over the period, the University of Mauritius had four main weaknesses. The university's proportions of masters plus doctoral students (target F2) and of doctoral students (target F3) were both below the flagship target and below the average for the eight flagship universities. Other weaknesses, which resulted in scores below the flagship targets as well as the flagship averages, were its student-to-staff ratio in programmes other than SET (target F7), and its outputs per academic of research publications (target F12) and of doctoral graduates (target F13).

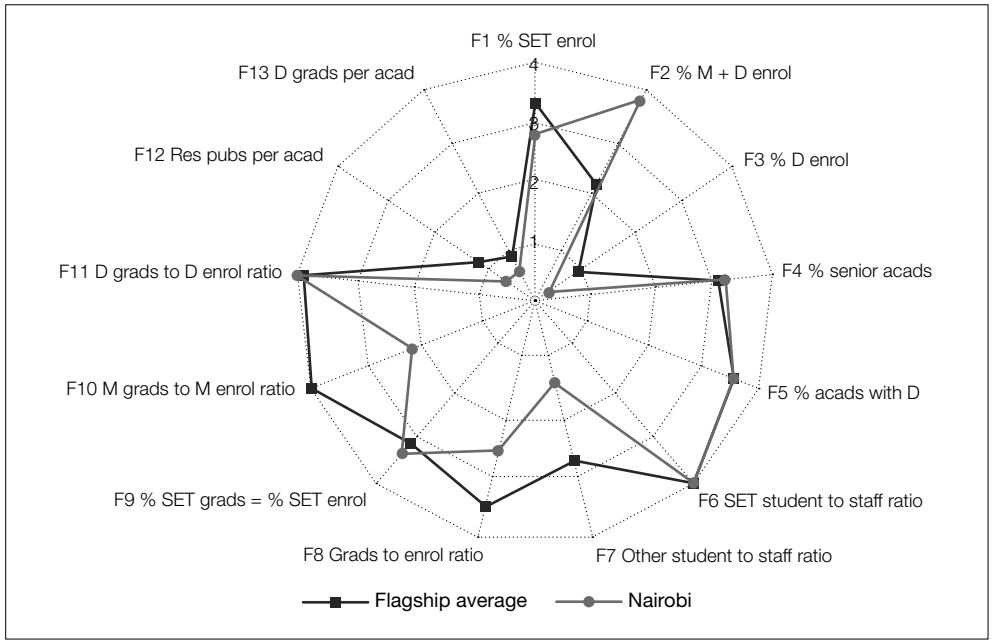
The Appendix Tables set the five-year context (2007–2011) for the areas in which Mauritius has appeared to be weak:

- Growth in enrolments at masters level has been slow (only 12% in 2011 compared to 2007) and growth at doctoral levels has been flat (Tables A3.6 and A3.8).

- The total of permanent academics increased by 40% and the total of academics with doctorates by 33% between 2007 and 2011 (Tables A3.10 and A3.11).
- Doctoral graduate totals increased between 2007 and 2011, but remained low at only 15 in 2011 (Table A3.9).
- Research publication totals remained low relative to the numbers of academic staff employed, but did increase from 36 in 2007 to 63 in 2011 (Table A3.13).

Finally, Figure 3.9 shows that Nairobi met only two of the 13 flagship targets. These related to its favourable ratio of FTE student-to-academic staff in SET programmes (target F6); and to its throughput rate of doctoral graduates (target F11). Nairobi came close to meeting two other goals with scores of 3.8 and 3.6 out of 4. These were its proportion of masters plus doctoral students (target F2), and its favourable FTE student-to-academic staff ratio in SET programmes (target F6).

Figure 3.9 University of Nairobi (2009–2011)



Compiled by Ian Bunting

Over the period, Nairobi had six main weaknesses. Its proportion of doctoral students (target F3) and its student-to-staff ratio in programmes other than SET (target F7) were both below the flagship targets and the averages for the eight flagship universities. Other weaknesses, that resulted in scores below the flagship targets and flagship averages, were its throughput of total

graduates (target F7), its throughput of masters graduates (target F10), its outputs of research publications per academic (target F12) and its outputs of doctoral graduates per academic (target F13). The Appendix Tables set the five-year context (2007–2011) for some of the areas in which Nairobi has appeared to be weak:

- Growth in enrolments at both masters and doctoral levels was very high. Masters enrolments grew from 6 145 in 2007 to 11 807 in 2011 (an increase of 5 662 or 92%). Doctoral enrolments were low relative to the size of Nairobi, but did grow from 62 in 2007 to 255 in 2011 (an increase of 193 or 311%) (Tables A3.6 and A3.8).
- The total of permanent academics remained flat (1 292 in 2007 and 1 382 in 2011), as did the total of academics with doctorates (581 in 2007 and 636 in 2011) (Tables A3.10 and A3.11).
- Doctoral graduate totals increased between 2007 and 2011, but remained low at only 61 in 2011 (Table A3.9).
- Research publication totals also remained low, relative to the numbers of academic staff employed, but did increase from 105 in 2007 to 198 in 2011 (Table A3.13).

Concluding notes

The main purpose of this chapter has been that of describing and explaining the steps that the HERANA project has taken in developing a methodology for assessing the performance of the eight flagship universities. The methodology adopted has made use of the academic cores of these universities as well as the empirical data that the HERANA project collected from them for the years 2009–2011. The methodology also made use of the South African policy account of a traditional university, in determining appropriate input and output goals and targets for these eight universities.

It must be stressed that the eight radar graphs presented in the previous section rely on the application of the two principles quoted at the start of this chapter:

- Any assessment of performance must be relative to a set of goals and targets that a university is expected to achieve; and
- A cross-national performance measurement system must be based on common goals and on a common set of quantitative targets linked to these goals.

The effects of assuming that these goals and quantitative targets are those of South Africa's category of traditional universities can be seen in Figures 3.2 to 3.9. What the graphs demonstrate is that only Cape Town has performed well *relative to this specific set of goals and targets*. On a different set of goals and targets, Cape Town's performance could appear to be weaker, and those of the other universities could become stronger.

These possibilities raise these main questions:

- Should the HERANA flagship universities be assessed on the assumption that they are subject to the mandates and output targets of South Africa's category of traditional universities? Should they be placed in some other categories of university?
- Should the input goals and targets for the flagship universities be adjusted? If so, what could these goals and targets be?
- The HERANA project has, in the case of the South African categories of comprehensive university and university of technology, proposed two different sets of mandates and of output targets. Should something similar be done for the flagship universities?

It is important to note that those comments, which have been based on five-year data for the eight flagship universities, reflect growing flagship strength in a number of key high-level knowledge areas. Examples are these include the following:

- Masters enrolments in the eight universities nearly doubled over this five-year period, increasing from 14 099 in 2007 to 26 052 in 2011. Exceptional growth in masters enrolments were recorded by Nairobi, which was up by 5 662 (or 92%) in 2011 compared to 2007, and Ghana, which was up by 2 777 (or 185%) over the same period.
- Doctoral enrolments grew by 76% in 2011 compared to 2007. High growth occurred at Makerere, which was up by 531 (or 1 659%) in 2011 compared to 2007; Ghana, which was up by 206 (or 187%); and Nairobi, which was up by 193 (or 311%) over the same period.
- The masters graduate total for the eight universities increased from 4 020 in 2007 to 7 156 in 2011. Substantial growth occurred at Nairobi, which was up by 1 545 (or 156%) in 2011 compared to 2007, and Ghana, which was up by 1 015 (or 176%) over the same period.
- Doctoral graduate totals grew, although not to the same extent as masters graduates. The doctoral graduate total for the eight universities increased from 241 in 2007 to 367 in 2011, which was an increase of 126 (or 52%) over this period.
- Research publication outputs increased at the same level as doctoral graduates. The largest increases were at Cape Town, which was up by 500 (or 49%) in 2011 compared to 2007; at Makerere, which was up by 149 (or 64%); and Ghana, which was up by 109 (or 179%) over the same period.

The data in Appendix Tables A3.10, A3.11 and A3.12 suggest that the provision of academic staff may be one of the limiting factors that the flagship universities will face in their attempts to improve their production of high-level knowledge. Points to note about changes in academic staff totals reflected in the three tables are as follows:

- The total growth in permanent academics at the eight universities was 1 465 (or 23%) in 2011 compared to 2007. This growth in academic staff should be compared to the total head count enrolment of the eight universities, which increased from 179 300 in 2007 to 251 400, an increase of 72 100 (or 40%) over this period. It should be noted that more than half of this growth in permanent academics occurred at Eduardo Mondlane, which was up by 819 (or 159%) in 2011 compared to 2007.
- The total growth of academics with doctoral qualifications at the eight universities was 682 (or 25%) in 2011 compared to 2007. The total of doctoral students requiring supervision increased by 1 125 (or 76%) over this period. It should be noted again that Eduardo Mondlane's increase was 129 (or 132%) and that Botswana's increase was 184 (or 62%).
- The overall average proportion for the eight universities of academic staff with doctorates was 42% in 2007 and 43% in 2011. This has to be read together with the overall proportion of senior academic staff (professors, associate professors and senior lecturers) at the flagship universities. This proportion was 46% in 2009 (data for 2007 were not available) and declined to 44% in 2011. These flagships may, taken together, have a permanent academic staff that is underqualified and too junior for the rigorous requirements of high-level knowledge production.

Some of the implications of this analysis will be addressed in Chapter 12.

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Appendix tables

Examples of early HERANA analyses

Table A3.1 University of Botswana: Academic core and comparative university scores

Goals	Targets	Botswana averages: 2001–2007	Averages for 2001–2007: Universities with student enrolments less than 20 000	
Goal 1: Proportion of enrolments in SET	40%	22%	Eduardo Mondlane Mauritius Dar es Salaam	49% 43% 38%
Goal 2: Masters + doctors enrolments as % of total enrolments	15%	8%	Dar es Salaam Mauritius Eduardo Mondlane	12% 10% 3%
Goal 3: Student-to-academic staff ratios	Below 20	15	Eduardo Mondlane Dar es Salaam Mauritius	11 15 24
Goal 4: Academic staff with doctoral degrees	50%	51%	Dar es Salaam Mauritius Eduardo	50% 45% 19%
Goal 5: Research funding per academic in purchasing power parity dollars	20 000	ppp dollars 2 000 (2007 only)	Dar es Salaam Mauritius Eduardo Mondlane	6 400 3 000 2 000
Goal 6: Ratio of graduates to enrolments in SET fields	20%	18%	Mauritius Dar es Salaam Eduardo Mondlane	26% 22% 8%
Goal 7: Doctoral graduates per permanent academic	15%	1%	Mauritius Dar es Salaam Eduardo Mondlane	2% 2% 0%
Goal 8: Research publications: per permanent academic	0.50	0.13	Mauritius Dar es Salaam Eduardo Mondlane	0.13 0.07 0.03

Compiled by Ian Bunting

Table A3.2 Example of application of extended academic core goals and targets

Goals	Targets	Data averages for 2009–2011		
		Cape Town	Ghana	Makerere
Goal 1: Strong enrolments in science and technology	1a: 40% of total enrolments to be in SET	43%	21%	37%
	1b: 50% of masters + doctoral enrolments to be in SET	59%	25%	57%
Goal 2: Strong postgraduate enrolments	2a: At least 15% of total enrolments masters + doctoral enrolments	20%	8%	7%
	2b: Ratios of masters to doctoral enrolments to be no more than 5:1	3	13	3
Goal 4a: High proportion of academic staff with doctoral degrees	4a: 50% of permanent academic staff to have doctoral degrees	62%	50%	31%
Goal 4b: (new) High proportion of academic staff to be in senior ranks	4b: 50% of permanent academic staff to hold ranks of professor, associate professor or senior lecturer	67%	76%	28%
Goal 8: High levels of new knowledge production	8a: Ratio in SET of research publications to permanent academic staff to be 1.0	2.50	0.23	0.48
	8b: Ratio in other fields of research publications to permanent academic staff to be 0.50	0.61	0.06	0.06

Compiled by Ian Bunting
Note: A highlighted cell indicates that the university has met the target set for that specific goal.

South African traditional universities

Table A3.3 Mandates for South African traditional universities

Mandate goals	Mandate targets
Student enrolments must be primarily in general formative and professional academic programmes	Target 1U: Professional plus general formative enrolment proportion to be at least 80%
Student enrolments must be primarily in major fields of study in SET and in humanities	Target 2U: Science and technology enrolment proportion to be at least 40%
Student enrolments must be primarily in undergraduate programmes, but with strong proportions in masters and doctoral programmes	Target 3U: Masters + doctoral enrolment proportion to be at least 20%.
	Target 4U: Doctoral enrolment proportion to be at least 5%
A high proportion of permanent academic staff members must be in senior rank categories	Target 5U: At least 60% of permanent academic staff to be in ranks of professor, associate professor or senior lecturer.
Permanent academic staff members must be well qualified	Target 6U: At least 50% of permanent academic staff to have doctoral degrees
Student-to-academic staff ratios must be favourable and able to support the institution's teaching/learning activities	Target 7U: Ratios of FTE students to FTE academics in science and technology to be at most 20:1
	Target 8U: Ratios of FTE students to FTE academics in all other fields to be at most 25:1

Compiled by Ian Bunting

Table A3.4 Output goals and targets for South African traditional universities

Output goals for traditional universities	Output targets for traditional universities
High undergraduate pass rates	Target 9U: Average pass rate of 80% in SET undergraduate courses
	Target 10U: Average pass rate of 80% in other undergraduate courses
High outputs of total graduates and of graduates in SET fields	Target 11U: Total graduates in given year to be at least 25% of total enrolments in that year
	Target 12U: SET graduates as % of total graduates to match SET enrolments as % of total enrolments
High outputs of masters and doctoral graduates	Target 13U: Total masters graduates in given year to be at least 25% of masters head count enrolments in that year
	Target 14U: Total doctoral graduates in given year to be at least 15% of doctoral head count enrolments in that year
High levels of new knowledge production by academic staff	Target 15U: Ratio of research publications to permanent academic staff to be at least 1.0
	Target 16U: Ratio of doctoral graduates to permanent academic staff to be at least 0.20

Compiled by Ian Bunting

Flagship universities

Table A3.5 Data averages for 2009–2011 for flagship universities

	Flagship targets	Botswana	Cape Town	Dar es Salaam	Eduardo Mondlane	Ghana	Makerere	Mauritius	Nairobi	Average for 8 flagships
SET enrolments as % of total enrolments	**40%**	22%	44%	19%	46%	23%	36%	44%	28%	**33%**
Masters + doctoral students as % of total enrolment	**20%**	8%	20%	11%	5%	9%	6%	10%	19%	**11%**
Doctoral students as % of total enrolments	**5%**	0%	5%	1%	0%	1%	1%	1%	0%	**1%**
Senior academics as % of total permanent academics	**60%**	44%	69%	34%	18%	80%	30%	47%	47%	**46%**
% academics with doctoral degrees	**50%**	65%	61%	49%	14%	50%	31%	41%	45%	**45%**
Ratio of SET FTE students to SET academics	**20:1**	9	11	7	11	9	16	21	11	**12**
Ratio of other FTE students to other academics	**25:1**	22	20	25	19	57	43	26	69	**35**
Average ratio of total graduates to total enrolments	**25%**	18%	28%	33%	7%	20%	30%	24%	16%	**22%**
SET graduates as % of total graduates	**% to be equal**	16%	36%	17%	23%	22%	35%	39%	24%	**26%**
SET enrolments as % of total enrolments		22%	44%	19%	46%	23%	36%	44%	28%	**33%**
Ratio of masters graduates to total masters enrolments	**25%**	17%	30%	64%	8%	37%	50%	34%	16%	**32%**
Ratio of doctoral graduates to total doctoral enrolments	**15%**	14%	16%	19%	4%	10%	10%	27%	19%	**15%**
Ratio of research publications per academic	**1.0**	0.16	1.46	0.11	0.04	0.15	0.27	0.17	0.14	**0.31**
Ratio of doctoral graduates per academic	**0.20**	0.01	0.17	0.02	0.00	0.02	0.04	0.05	0.03	**0.04**

Compiled by Ian Bunting
Source: Summary of Data Returns from HERANA universities (Bunting 2013)

Selected flagship data tables for 2007–2011

Table A3.6 Masters enrolments for the five-year period 2007–2011

University	2007	2009	2011	Change: 2011 compared to 2007	
Botswana	951	1 257	1 254	303	32%
Cape Town	2 906	3 306	3 831	925	32%
Dar es Salaam	552	949	922	370	67%
Eduardo Mondlane	420	1 054	1 295	875	208%
Ghana	1 503	2 588	4 280	2 777	185%
Makerere	763	1 470	1 705	942	123%
Mauritius	859	840	958	99	12%
Nairobi	6 145	10 600	11 807	5 662	92%
TOTAL	**14 099**	**22 064**	**26 052**	**11 953**	**85%**

Compiled by Ian Bunting

Table A3.7 Masters graduates for the five-year period 2007–2011

University	2007	2009	2011	Change: 2011 compared to 2007	
Botswana	186	217	206	20	11%
Cape Town	751	1 009	1 085	334	44%
Dar es Salaam	392	567	566	174	44%
Eduardo Mondlane	23	117	109	86	374%
Ghana	576	1 101	1 591	1 015	176%
Makerere	744	847	670	-74	-10%
Mauritius	360	196	396	36	10%
Nairobi	988	2 015	2 533	1 545	156%
TOTAL	**4 020**	**6 069**	**7 156**	**3 136**	**78%**

Compiled by Ian Bunting

Table A3.8 Doctoral enrolments for the five-year period 2007–2011

University	2007	2009	2011	Change: 2011 compared to 2007	
Botswana	41	51	54	13	32%
Cape Town	1 002	1 058	1 226	224	22%
Dar es Salaam	190	98	128	-62	-33%
Eduardo Mondlane	3	17	23	20	667%
Ghana	110	241	316	206	187%
Makerere	32	471	563	531	1 659%
Mauritius	49	49	49	0	0%
Nairobi	62	281	255	193	311%
TOTAL	**1 489**	**2 266**	**2 614**	**1 125**	**76%**

Compiled by Ian Bunting

Table A3.9 Doctoral graduates for the five-year period 2007–2011

University	2007	2009	2011	Change: 2011 compared to 2007	
Botswana	3	8	10	7	233%
Cape Town	142	176	163	21	15%
Dar es Salaam	20	12	24	4	20%
Eduardo Mondlane	0	0	2	2	–
Ghana	11	16	36	25	227%
Makerere	23	38	56	33	143%
Mauritius	10	11	15	5	50%
Nairobi	32	18	61	29	91%
TOTAL	**241**	**279**	**367**	**126**	**52%**

Compiled by Ian Bunting

Table A3.10 Total permanent academics for the five-year period 2007–2011

University	2007	2009	2011	Change: 2011 compared to 2007	
Botswana	767	712	744	-23	-3%
Cape Town	889	900	1 055	166	19%
Dar es Salaam	900	777	906	6	1%
Eduardo Mondlane	514	1 209	1 333	819	159%
Ghana	767	890	1 058	291	38%
Makerere	1 179	1 150	1 209	30	3%
Mauritius	201	264	287	86	43%
Nairobi	1 292	1 288	1 382	90	7%
TOTAL	**6 509**	**7 190**	**7 974**	**1 465**	**23%**

Compiled by Ian Bunting

Table A3.11 Permanent academics with doctoral degrees for the five-year period 2007–2011

University	2007	2009	2011	Change: 2011 compared to 2007	
Botswana	299	456	484	184	62%
Cape Town	516	522	665	149	29%
Dar es Salaam	450	427	408	-42	-9%
Eduardo Mondlane	98	60	227	129	132%
Ghana	360	454	529	169	47%
Makerere	365	345	375	9	3%
Mauritius	90	108	121	30	33%
Nairobi	581	580	636	54	9%
TOTAL	**2 760**	**2 952**	**3 443**	**682**	**25%**

Compiled by Ian Bunting

Table A3.12 Proportion of academics with doctoral degrees for the five-year period 2007–2011

University	2007	2009	2011
Botswana	39%	64%	65%
Cape Town	58%	58%	63%
Dar es Salaam	50%	55%	45%
Eduardo Mondlane	19%	5%	17%
Ghana	47%	51%	50%
Makerere	31%	30%	31%
Mauritius	45%	41%	42%
Nairobi	45%	45%	46%
AVERAGE	**42%**	**41%**	**43%**

Compiled by Ian Bunting

Table A3.13 Research publications for the five-year period 2007–2011

University	2007	2009	2011	Change: 2011 compared to 2007	
Botswana	106	128	108	2	2%
Cape Town	1 017	1 309	1 517	500	49%
Dar es Salaam	60	92	90	30	50%
Eduardo Mondlane	23	40	46	23	100%
Ghana	61	124	170	109	179%
Makerere	233	230	382	149	64%
Mauritius	36	29	63	27	75%
Nairobi	105	173	198	93	89%
TOTAL	**1 641**	**2 125**	**2 574**	**933**	**57%**

Compiled by Ian Bunting

CHAPTER 4

RESEARCH OUTPUT AND INTERNATIONAL RESEARCH COOPERATION IN AFRICAN FLAGSHIP UNIVERSITIES

Robert Tijssen

Research internationalisation processes

Following global trends, the internationalisation in Africa's higher education landscape is driven by a range of interconnecting new developments: an increase in the numbers of students and institutions; more mobility of students and staff across national boundaries; the growing role of the English language in classrooms and research environments; improved internet connectivity; and a host of policy initiatives such as centres of excellence, quality assurance frameworks, and programmes to enhance institution collaboration. Africa's leading 'flagship' universities are looked upon as role models, and perhaps sources of inspiration, for how to learn and benefit from these processes. The concept 'flagship university', recently introduced by Douglass (2014), implies that each less-developed country or emerging economy should have at least one of these universities. In addition to their scientific research and teaching activities, the flagship university is expected to engage in 'third mission'-type activities, such as regional economic engagement, technology transfer, links with secondary schools and other tertiary institutions, and providing leadership in national governance and management structures.

Research-intensive flagships are often engaged in international research cooperation, and in doing so follow international standards of scientific quality and research productivity. Internationalisation processes may provide many other gains and benefits to Africa's leading research universities. It enables access to knowledge, skills, facilities, infrastructures and funding from elsewhere, which may contribute to improved quality of teaching, training and learning. At the level of individual researchers and their research programme managers, being exposed to international contacts is likely to contribute to the acquisition of new knowledge, interpersonal and intercultural communication skills (e.g. English language), and mediation skills, but also

the ability to engage in networking and teamwork-based problem-solving effectively. These professional competencies are assets that may enhance mobility, employability and transferable skills (of both students and staff) across borders within world science. Extensive international contacts and successful long-term collaborative activities with foreign research partners are bound to have significant impacts, such as the increased production of research publications, attracting foreign academic staff and foreign PhDs, and acquiring funding from international sources.

All of these are amenable to systematic data collection and comparative data analysis. This chapter, however, restricts its attention to their impacts on the output of the knowledge production process and, in particular, the contributions to research output published as articles in scientific journals, in the eight flagship universities[1] in the Higher Education Research and Advocacy Network in Africa (HERANA) project.

Research publication output and international visibility

Research publications in peer-reviewed scholarly and technical journals are often seen as the prime output of high-quality scientific knowledge production. One might assume that these 'international research publications' are preceded or followed up by a string of other publications, such as research reports, working papers, book chapters or research articles in 'local' journals. In almost all cases, these other 'non-international' publications are not (sufficiently) captured by the international bibliographical databases – notably Thomson Reuters' Web of Science (WoS) database and Elsevier's Scopus database.[2] As a result, they tend to remain under the radar – inaccessible and unavailable for comprehensive and systematic studies of research performance. Moving up from low levels of visibility in previous decades (see, e.g., Tijssen et al. 2006), the last three to four years have seen more African science journals being indexed by both databases, while other sources such as African Journals Online are also expanding their coverage of Africa's scholarly literature. However, the content and coverage is still insufficient for large-scale systematic comparisons of African flagship universities.

Given its analytical objective, this study therefore restricts its scope to international publications, and more specifically to counts of WoS-indexed publications. This database currently contains only 101 African journals (of which 87 are South African),[3] which constitutes less than 1% of the estimated 14 000 journals in the total WoS coverage of worldwide scientific literature. The WoS-indexed publications produced by African universities represent merely a tip of the iceberg – but an interesting tip nonetheless, since this is what internationalisation may lead up to in African flagship universities: producing high-quality science with publications

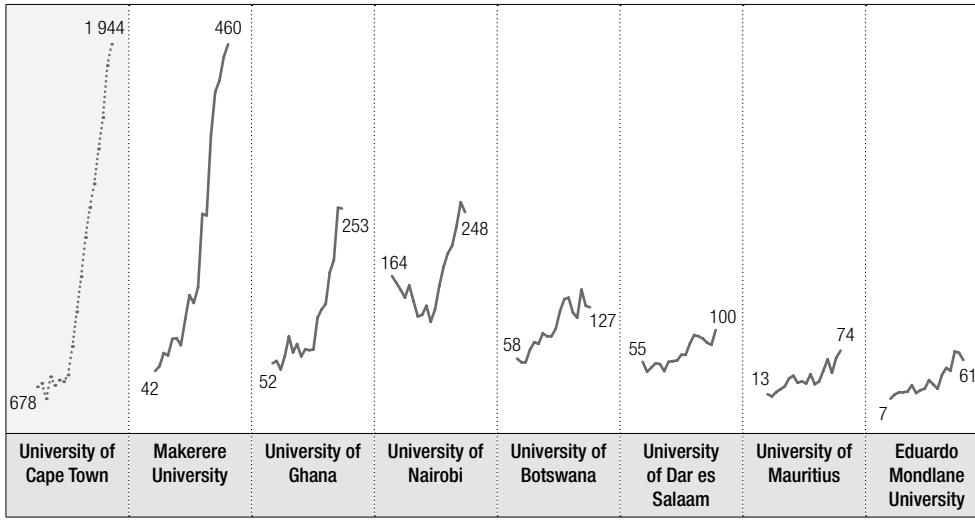
1 The universities of Botswana, Cape Town, Dar es Salaam, Eduardo Mondlane, Ghana, Mauritius, Makerere and Nairobi.

2 Web of Science website: http://thomsonreuters.com/thomson-reuters-web-of-science/; Scopus website: http://www.elsevier.com/online-tools/scopus

3 Personal communication, Nelius Boshoff, Centre for Research on Evaluation, Science and Technology (27 November 2014).

that deserve and gain international visibility. However, we cannot assume that this particular top slice of a university's publication output is actually representative of all their international collaborative research, if only because some of the joint research projects fail and thus produce nothing worthwhile for publishing, or because sometimes the findings are disseminated elsewhere (either in print or online). In other cases, the work is still ongoing without any written output for outside readerships.

Figure 4.1 Annual trends in publication output of African flagship universities (1996–2013)



Compiled by Robert Tijssen
Source: CWTS/Thomson Reuters Web of Science database

Figure 4.1 shows the overall trends in annual publication output of each of the HERANA universities since 1996. All eight universities show an upward trend in recent years, some from low baseline levels. The rise of the University of Cape Town and Makerere University is particularly significant. There was a considerable percentage increase in publication output, particularly beyond 2010, with Makerere and Ghana in the lead (whereas the University of Nairobi and University of Botswana were slowing down). These growth rates result from the interplay between contributing factors. They are not directly comparable across institutions, if only because each university operates within a unique environment (or 'local ecosystem') of national and institutional determinants, incentives and obstacles. Notably, in the case of the University of Cape Town, part of the upsurge most likely resulted from the publication-boosting national subsidy system that was implemented in South Africa in the mid-2000s. Nonetheless, in the ensuing analysis we assume that all these university-specific growth trajectories are at least also partly driven by international collaboration and the increased production of internationally co-authored publications. Moreover, one might expect that these international partners have

been part of local research capacity-building, and creating effective organisational and managerial structures, which enabled the production of these co-publications.

Many of those WoS-covered research publications are co-productions between African-based researchers and their foreign research partners. The author affiliation lists in the publications are the telltale sign. Here one finds the author names and institutions from countries elsewhere – sometimes on the African continent, but more often of colleagues in Europe, Asia or the United States. Straightforward counts of these 'international co-publications' provide empirical data as to the relative magnitude of international cooperation within African science and, more importantly, general trends over time (AOSTI 2014; Boshoff 2009; Sooryamoorthy 2009; Tijssen 2007).

International cooperation and co-authored research publications

Not only does this kind of quantitative data allow for institutional comparisons across African universities, it also enables us to compare scientific fields within each university. These fields are usually defined according to a classification of the publications' content, or the scholarly journals in which they were published. Often, for the sake of simplicity, the wide range of fields is aggregated into the four 'STEM' domains (Science, Technology, Engineering and Mathematics) and non-STEM remainder (Social Sciences, Humanities, Law and Arts). A recent study conducted by the World Bank investigated the state of STEM research in sub-Saharan Africa (Lan et al. 2014). According to their Scopus-based trend analysis, across the years 2003–2012, some 60% of the STEM publications produced by these countries were internationally co-authored. Less than 10% of all publication output in sub-Saharan Africa relates to international collaboration between sub-Saharan Africa countries. The vast majority of co-authoring partners is non-African. The African Observatory of Science, Technology and Innovation (AOSTI 2014: xvi) states in a recently published Scopus-based indicators report:

> *Collaboration between AU members is infrequent, occurring in only 4.1% of AU scientific papers in 2005–2007 and in 4.3% of the papers in 2008–2010. Although having a high percentage of external collaboration (with non-African countries) is usually interpreted as a positive aspect in scientific knowledge production, too high a level of external collaboration may denote a situation of dependence. Mostly, external funding and the related grant conditions, compounded with the scarcity of significant funding sources from within Africa, may drive the high weight of international collaboration found in this study. Furthermore, the lack of strong collaboration frameworks in S&T to foster cooperative research within Africa is another drawback.*

In the comparative trend analysis of the eight flagships' performance profiles, the state of affairs at the level of scientific fields is unpacked and explored. The publication output and citation impact scores relate to fields such as Clinical Medicine, Physics and Materials Science, Agriculture and Food Science, and Psychology. The descriptive analysis provided later in this chapter focuses its attention on the largest fields of research within each university. But first we need briefly to introduce a second analytical tool for assessments of internationalisation: the citation impact of research publications.

Citations to publication and international scientific impact

Each international co-publication obviously defines a unique piece of knowledge in terms of how it came about. It leaves its own fingerprint in the science literature, differing from others in terms of their content matter ('what' – the sub-field) and institutional frameworks ('who' – co-authors and institutional partners), but also their knowledge production objectives and dissemination strategies ('why'). Depending on the publication's quality and topicality, and some degree of chance, the work may become acknowledged and utilised among researchers. Such impacts on the work of fellow researchers are partially captured by the reference list of follow-up research publications on the same or related topics. These 'citations' – from either the authors themselves (self-citations) or from colleagues and peers at other institutions (external citations) – reflect the 'scientific impact' of research. Applying the method of citation-analysis to WoS-indexed international co-publications enables us to gauge that impact in world science. Counting the number of citations measures the degree of impact as well as citation impact trends over time. The 'fingerprint' creates an 'impact path' through the time-space fabric of world science.

However, simply counting citations is not enough. Citation impact analyses should take into account the publication propensities, communication practices and citation characteristics within fields. There are large differences between those fields – some are slowly evolving (few publications per researchers, few citations); others are much faster and dynamic (many publications and citations) (e.g. Mathematics is seen as slow and Biomedicine as fast). To correct for these disparities, 'field-normalised citation impact scores' are applied. Basically, the accumulated number of citations to a paper, or set of papers, is compared to the average citation numbers in the respective field(s). This enables the comparison of citation impact scores across fields and sub-fields. A score of 1.0 indicates a world average impact rate; a score of 2.0 is twice the world average; 0.5 is half that average; and so on. Scores above 2.5 or 3.0 are often seen as representing very high impacts, in some cases reflecting institutionalised niches of 'international excellence'. The AOSTI report, focusing its analysis on African Union countries, clearly shows that internationally co-authored research publications tend to be much higher-cited than single-country publications, especially if at least one of the co-authoring partners is based outside of Africa (AOSTI 2014: 36).

Comparisons across high-profile fields of science

Table 4.1 indicates the largest research field in each university in terms of international co-publications, as well as the associated citation impact score of those publications, for the period 2006–2012. These large fields of international collaborative research are often areas where the flagship has, over the years, accumulated a 'critical mass' of international-level resources and capabilities to engage successfully with a variety of research partners abroad. The majority of the cases reveal areas of strength within Clinical Medicine; research areas related to tropical diseases; and trials of new medicines that involve many international research partners. Environmental Sciences and Technology are important at the Universities of Dar es Salaam and Botswana. The University of Mauritius has Chemistry and Chemical Engineering as an area of international strength. The corresponding citation impact scores are relatively high in Clinical Medicine. Some of this research is highly cited in the international scholarly literature (citation scores above 2.0) or at the very least significantly above the world average (i.e. above 1.25).

Table 4.1 Largest research fields of international cooperation (2006–2012)

University	Field of science	International co-publications	Citation score
Cape Town	Clinical Medicine	1 779	2.06
Makerere	Clinical Medicine	1 016	1.61
Nairobi	Clinical Medicine	461	1.45
Ghana	Clinical Medicine	292	1.41
Eduardo Mondlane	Clinical Medicine	134	2.46
Dar es Salaam	Environmental Science and Technology	111	0.91
Botswana	Environmental Science and Technology	99	0.87
Mauritius	Chemistry and Chemical Engineering	42	0.47

Table 4.2 presents the most highly cited fields in each flagship university. These fields contain 20 international co-publications or more, on average almost three papers per year, thus constituting a sufficiently large volume of international cooperation outputs to enable meaningful comparisons across the eight universities. One cannot help but notice a considerable overlap between Tables 4.1 and 4.2: international research activities and citation impact are clearly positively correlated. Again, most of the highly cited international cooperation occurs within Clinical Medicine – with the University of Cape Town being the main exception, being a partner in (highly cited) international research networks and consortia dealing with (high energy) Physics or related domains such as Materials Science. Botswana has a remarkably low score (but scores 2.26 in Mathematics with 19 international co-publications). The top position of Eduardo Mondlane University suggests high-quality science, perhaps even the presence of a local 'centre of excellence'. However, statistics can be deceiving and require closer

scrutiny; this University might well be just one of many co-authoring institutional partners (not necessarily the leading partner), and one should keep in mind that citation impact scores are time-dependent and often based on just one or two highly cited papers. Strong claims about scientific excellence require strong evidence.

Table 4.2 Most highly-cited fields of international cooperation (2006–2012)

University	Field of science	International co-publications	Citation score
Eduardo Mondlane	Clinical Medicine	134	2.46
Cape Town	Physics and Materials Science	463	2.35
Makerere	Clinical Medicine	1 016	1.61
Dar es Salaam	Clinical Medicine	42	1.45
Nairobi	Clinical Medicine	461	1.45
Ghana	Clinical Medicine	292	1.41
Mauritius	Biological Sciences	21	1.40
Botswana	Clinical Medicine	53	0.99

Collectively, these findings indicate very substantial levels of international research cooperation in some fields in at least five of these universities, with fairly high-citation impact levels alongside. Clinical Medicine is clearly a key focal point and research strength in international research partnerships.

Profiling at a glance

Focussing on recent changes at the level of fields, we now examine general patterns and trends within and across the eight flagships. The summary findings are presented in a graphical framework in which international co-publication output counts and citation impact scores are compared. It applies to each university's major fields of science; that is, those with more than 20 international co-publications in the period 2006–2012. (In the case of Makerere University and the University of Cape Town the threshold is set at 30 or 50, respectively, because of their larger total research output volumes in the WoS.) The framework presents the university's research specialisation profile insofar as international collaboration is concerned. The recent trends in both publication output and citation impact refer to a series of overlapping four-year windows: 2006–2009, 2007–2010, 2008–2011 and 2009–2012. The dynamics (if any) are crudely phrased in terms of either 'Noticeable decline' or 'Noticeable growth'. Lack of either is denoted as 'Steady state'.

Table 4.3a profiles the University of Mauritius, one of the smallest of the eight in terms of its international co-publications, with just two fields of sufficient size. The largest stride forward

has occurred within Chemistry and Chemical Engineering, where the number of international co-publications has increased – although this has not (as yet) resulted in a higher number of citations. The other field, Biological Sciences, shows no significant changes either way.

The profiles of the other seven universities, presented in order of the total number of fields presented in the graph, show much more dynamic and distinctly different profiles (see Tables 4.3b to 4.3h). Empty rows or columns are omitted from these graphs. The large internationalised fields in each university – those comprising more than 50 international co-publications in any of those four time-windows – are highlighted in *italics*. The results are presented below without attempts to describe or interpret individual profiles; this level of analysis requires in-depth studies by others with insider knowledge (or is left to the insights of the reader).

Table 4.3a Research internationalisation profile of the University of Mauritius

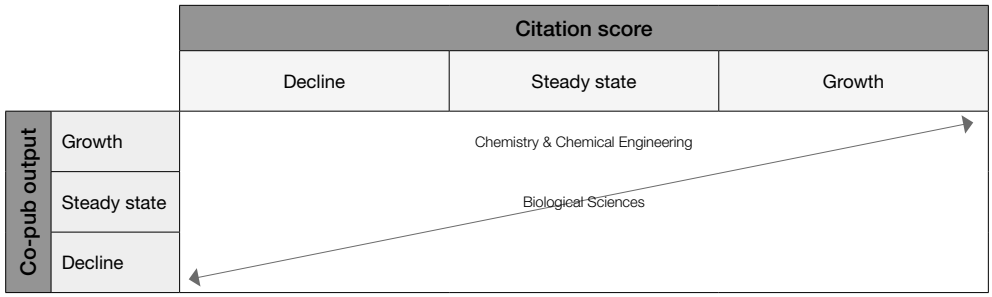


Table 4.3b Research internationalisation profile of Eduardo Mondlane University

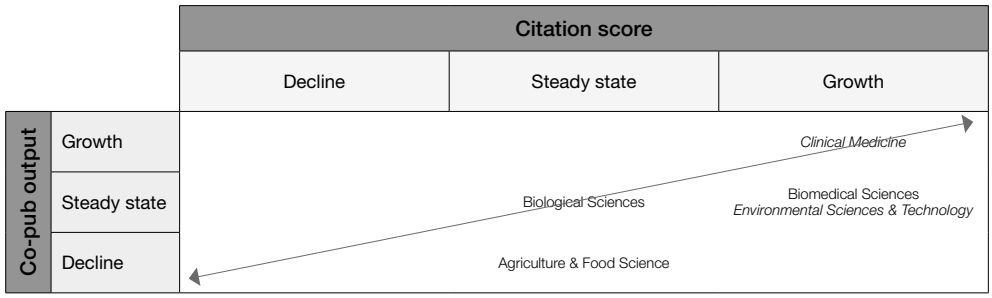


Table 4.3c Research internationalisation profile of the University of Dar es Salaam

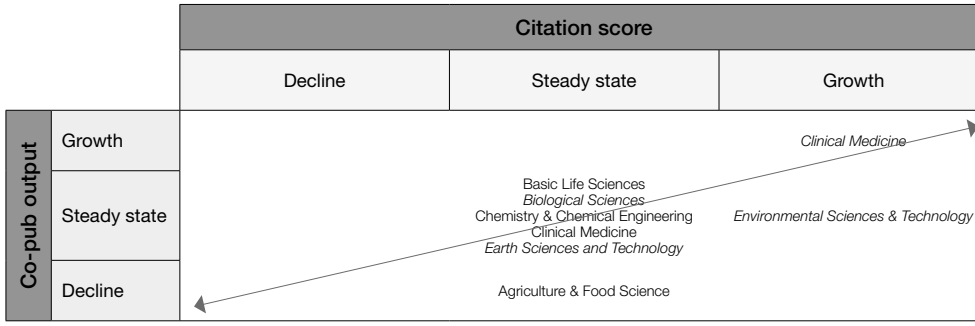


Table 4.3d Research internationalisation profile of the University of Ghana

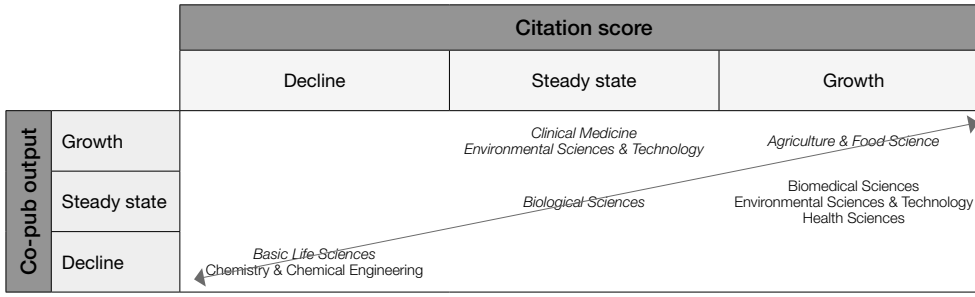


Table 4.3e Research internationalisation profile of the University of Botswana

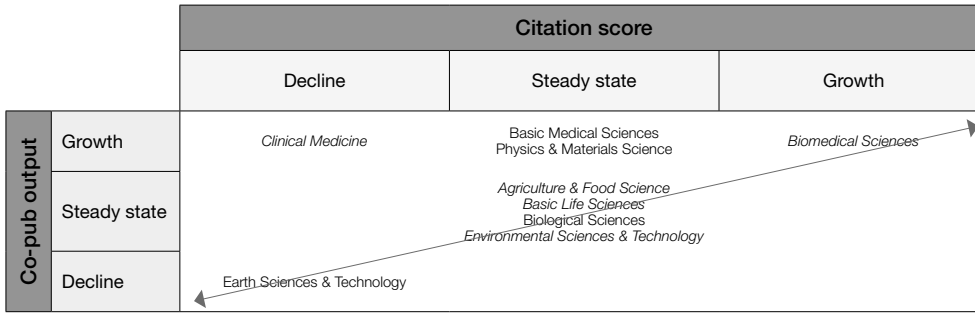
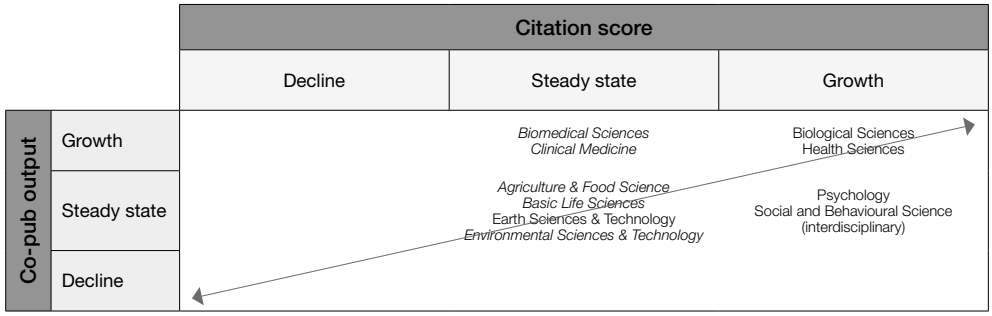


Table 4.3f Research internationalisation profile of Makerere University*



* Minimum threshold for a field's inclusion: 30 international co-publications in 2006–2012

Table 4.3g Research internationalisation profile of the University of Nairobi

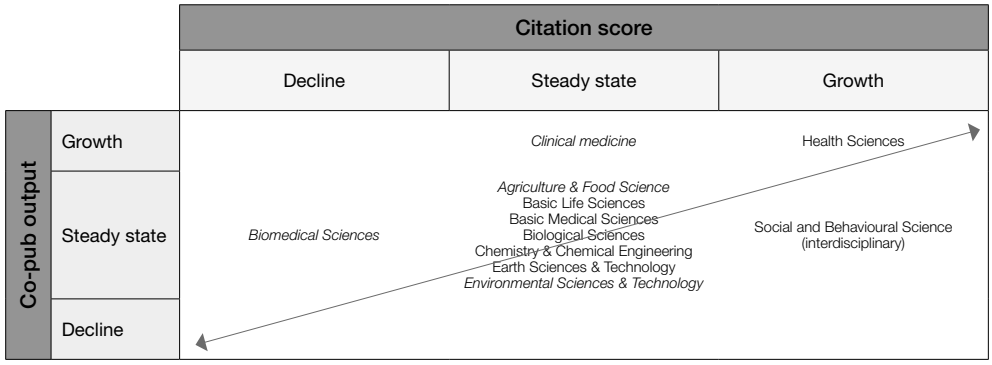
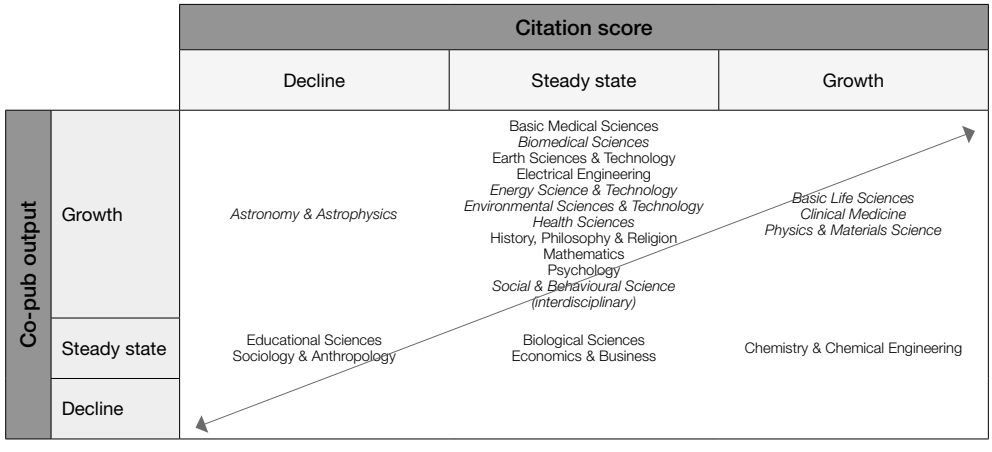


Table 4.3h Research internationalisation profile of the University of Cape Town*



* Minimum threshold for a field's inclusion: 50 international co-publications in 2006–2012

The empirical findings show that a marked upward shift is clearly visible across most fields of science – often in publication output and sometimes in output and citation impact. This leads to the general conclusion that these eight flagships are internationalising their research efforts, and are doing so across a wide range of fields. This positive development would, in turn, imply that the required financial and human resources, and research infrastructures, within those universities are improving and/or expanding. This suggests the presence of sustainable organisational units, research environments and international networks to support and drive such growth processes – in which, hopefully, talented PhD students or indigenous researchers have been recruited or trained to become Africa's new generation of elite scientists and scholars. Citation impact analysis of Africa's top 500 most highly cited researchers shows that half of the current elite 'have more than 50% of their publications internationally co-authored, primarily with researchers outside Africa' (AOSTI 2014: 38). Is this a cause or effect of internationalisation? That is an open question waiting for further studies. Either way, it is the mix of research internationalisation and of effective resources development that constitutes two indispensable key ingredients for boosting the scientific power of African research universities.

Summarising these profiles in terms of general characteristics, each one defines its own distinctive research specialisation profile, with areas of research strength and their growth trajectories. Wide diversity is to be expected: it reflects the different historical backgrounds, local governance and national policy environments, and institute-specific aspirations and ambitions of each university. It also underscores the necessity for caution when attempting to compare university performance profiles. These graphs are not suited for 'like with like' benchmarking; they require further in-depth information-gathering and extensive contextualised analysis.

From statistical data to strategic intelligence

Viewing scientific knowledge production and research internationalisation through the WoS lens of quantitative data presents university administrators with an empirical evidence base for a closer look at general patterns and trends – notably within their own university, but perhaps also in comparable research-intensive universities. Adopting this vantage point comes with a cautionary note, a disclaimer of sorts, because these numbers and statistics have limited analytical value when separated from their underpinning knowledge-creation processes. They only become informative narratives when placed in the proper context, notably the social, cultural, institutional or even economic determinants that influence new knowledge production in these flagship universities. The HERANA project, and its series of empirical studies, provides such a context. Interested readers are referred to Chapter 2 and its references to further reports from the HERANA project.

These trend data are certainly indicative of changes within and across these flagships but

need closer scrutiny to draw any firm conclusions for strategic management. The seven-year time frame (2006–2012) is relatively short and should be expanded, both backwards and forwards, in order to produce more robust observations and to draw more definitive conclusions as to the extent and nature of internalisation processes. Moreover, growth in international publication output might have gone up because of one or more 'structural' institutional factors, such as more research activity; increased efficiency in running and finalising projects; improved technical facilities and equipment; incentives to publish in WoS-indexed sources; more effective methods of getting publications into these sources; the composition and size of research teams; the introduction of new (local) journals into the WoS; and/or changes in (co-)authorship practices. One might assume that during this short time span any of these determinants may have played a minor or major role. Owing to the lack of evidence otherwise, this study assumes that the growth (or decline) is mainly because of corresponding changes in research activity levels. In-depth case studies are required to examine this critical assumption, and to identify each university's unique interplay of institutional factors and main driving forces.

Such follow-up studies should also closely examine the various university-specific developmental trajectories that seem to emerge from the graphs, provided one is willing to assume that the combined growth of international co-publications and the rise of citation impact in a field reflects a certain 'best case' measure of success in becoming more acknowledged and more visible internationally. Zooming in on the upper right hand corner of each graph, we find nine fields (distributed across six universities) where such growth patterns have occurred. Most of these growth areas related to the medical and life sciences, and in most cases they already represent quite substantial numbers of international co-publications. The remainder seem to be in 'catching-up' processes. The general impression is that several of these flagships are mainly expanding on, and gaining from, strengths in pre-existing high-quality fields; in other words, the strong are getting stronger. As for 'worst case' trajectories, very few fields are found where both output and citation impact is declining – all of which are fairly small fields in terms of international co-publications to start with, and now appear to be sliding backwards.

Currently many areas of growth are in the medical and life sciences. Given the urgency of local socio-economic problems, research universities obviously must devote considerable resources to indigenous disease-related problems in Africa. But they must also broaden their knowledge-/skills-base to other fields and other domains of societal relevance, where international cooperation can boost scientific performance and research capabilities. Under the right conditions there is a fair chance that this will eventually happen, if only because research internationalisation tends to leverage 'spill-over' effects beyond the rapidly internationalising field itself – either in supporting adjacent fields of science; promoting international quality standards; or transferring new insights and innovative technologies from scientific research into science-based education or community services.

Opportunities and threats

Research internationalisation opens up opportunities but poses threats as well. With regard to the latter, indigenous African scholars might be tempted to leave for better circumstances and opportunities outside the continent. However, African universities might benefit from internationalisation in terms of staff development and providing new opportunities for junior staff to obtain PhDs. African universities can 'fast forward' by effectively connecting to global research networks. The findings in this chapter show that several African universities are already heavily engaged in this process. Linking up with colleagues in the world's advanced economies will no doubt strengthen their research capacity; enhance university information and communication technology infrastructures; develop a new generation of African academics and reverse the brain drain; and help forge strategic alliances with high-quality research partners. It is also crucial in educating globally competent graduates. Ultimately, many African research universities will become full members of the global knowledge society and, in the process, contribute more and more to socio-economic development in their respective countries.

The benefits of research internationalisation require investments that may come with risks and at a cost. The risks include the perpetuation of brain drain; commodification and commercialisation of research outputs; and unfair collaborative arrangements dominated by hegemony of universities in the advanced economies. Although internationalisation attracts foreign research funding and opens up opportunities for additional funds, emphasising and prioritising the drive towards further internationalisation might also draw away scarce resources that could perhaps have been better deployed for other important (and often contradictory) institutional roles of research universities within Africa (see Chapter 1). University management should develop institutional policies and strategies for internationalisation so that it is not treated as an incoherent and uncoordinated activity. The choices made by university administrators, and their reasons for doing so, raise a host of questions as to how far and how rapidly internationalisation of research is allow to spread within a university before perceived short-term disadvantages are seen to outweigh the anticipated longer-term benefits. There has also been a lack of institutional dialogue about the realities and consequences of research internationalisation, which may have emerged despite of (or because of?) weak governance structures and regulatory frameworks, poor planning and inadequate financial support. Further empirical studies, at the heart of each university, could shed more light on this research management dilemma.

The quantitative data and metrics presented in this chapter provide input for university research performance indicators. Developing targeted and customised indicators (i.e. designed and shared amongst a group of African institutions) might not only create a much greater awareness and appreciation of their possible use in university research management and planning, but may also create a 'regional standard' for benchmarking. In that sense, it

has the potential to be much more informative and useful than the current world university rankings. Such a level of transparency might also help to get African governments and development agencies to support struggling research-active universities, on a continent where most universities are still teaching-orientated.

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CHAPTER 5

SOUTH AFRICA AS A PHD HUB IN AFRICA?

Nico Cloete, Charles Sheppard and Tracy Bailey

International debates about doctoral education

Internationally, the importance of the doctorate has increased disproportionally in relation to its contribution to the overall graduate output. This heightened attention has not been predominantly concerned with the traditional role of the PhD, namely the provision of a future supply of academics. Rather, it has focused on the increasingly important role that higher education is perceived to play in the knowledge economy, specifically with regard to high-level skills. If knowledge and information are the new electricity of the economy (Castells 1993), then it is a reasonable assumption that the university – as the main knowledge institution in society – will become increasingly important, and that its apex training product, the PhD, will appear on the skills radar (Gorman 2013). As such, current debate about the doctorate is mainly concerned with the contribution to and place of the PhD graduate in the knowledge economy. One strand of the debate is about strengthening the university as knowledge producer. Another relates to the doctorate as a contributor to 'talentism': in other words, the global search for talent. In this sense, the debate is concerned with high-level skills – both research and analytical – outside of the university, be it within industry or the public sector (Cloete & Mouton forthcoming).

Another feature of the international debates is the uneven distribution of doctoral students (in terms of both enrolment and graduation) across the globe. This can be seen as reflecting the different histories of doctoral production in different parts of the world and is associated with variations across higher education systems. Thus, with regard to doctoral production internationally, two groups emerge. The first includes South Korea, Singapore, Taiwan and Mexico – all acknowledged members (if not leaders) in the knowledge economy, and all countries where doctoral output is already high. The second group includes the BRICS countries (Brazil, Russia, India, China and South Africa). Of particular interest is that the governments of China and Brazil are formulating targeted policies and making significant investments in order to increase doctoral and research output, as part of their effort to improve their positions in the

global rankings by catching up within the knowledge economy. Regarding China, Cyranoski et al. (2011) reported that the number of PhD-holders has gone through the roof, with more than 50 000 graduates in 2009, and that by 2011, China was producing more PhDs than any other country. Brazil initiated the 'Science Without Frontiers' programme to provide publicly funded grants to 75 000 students, with the Secretariat of Strategic Affairs aiming to raise financing from the private sector for a further 25 000 grants (Hennigan 2011). Of the 100 000 fellowships in the four-year programme, around 10% are earmarked for doctoral studies. Another 10% allocated to post-doctoral fellowships will benefit young Brazilian professors spending a year on sabbatical at a university abroad (Schwartzman 2013).

More comparable to South Africa is Malaysia. After a long debate about differentiation, five of Malaysia's 65 universities and colleges have been granted 'research university' status and these institutions receive additional government funding. The five research universities have undertaken to raise their output of research papers in Web of Science journals. The research output increase is linked to a reform in PhD programmes: in addition to increasing the numbers of students, the conventional dissertation has been replaced by the requirement for Web of Science-accredited paper publications. The number of PhD students in Malaysia has increased from about 4 000 in 2002 to almost 40 000 in 2012, and about half of these students are attached to the research universities. For example, the Universiti Teknolgi Malaysia has seen an increase in PhD students from 300 in 2002 to 4 500 in 2012. The University now has more postgraduate than undergraduate students – a trend that is expected to continue up to 70% postgraduates by 2020, and by that time, 30% of all enrolments will be PhD candidates. Not only has the number of PhD students increased, the proportion of international PhD students has increased from 25% in 2002 to almost 50% in 2012 (Hansen 2013).

Africa is part of the debate

Africa has certainly not been left out of the debate about the importance of the doctorate. During 2012 alone, discussions on doctoral education took place via a number of initiatives including: an International Association of Universities (IAU) and Catalan Association of Public Universities (ACUP) international seminar entitled 'Innovative Approaches to Doctoral Education and Research Training in Sub-Saharan Africa' (IAU-ACUP 2012); the Southern African Regional Universities Association leadership's 2012 dialogue, 'Doctoral Education: Renewing the Academy'; and the IAU's report *Changing Nature of Doctoral Studies in Sub-Saharan Africa* (IAU 2012). In 2013, the National Research Foundation in South Africa together with the Carnegie Corporation of New York convened a workshop entitled 'Expanding and Sustaining Excellence in Doctoral Programmes in Sub-Saharan Africa: What needs to be done?'

Prof Is-haq Oloyede, speaking as Chair of the IAU Task Force at the IAU-ACUP seminar, highlighted the direct link between doctoral studies and research for the development of Africa. He stressed the importance of supervision and career development for university and national advancement, and called for more synergy and collaboration to broaden the development of

doctoral education in African universities (IAU-ACUP 2012). The importance of doctoral education was echoed by the Chairperson of the African Union Commission, Dr Nkosazana Dlamini-Zuma, when she stated at an NRF/Carnegie Corporation meeting in 2013: 'You must look at ways to train thousands more PhD students on the continent' (Namuddu 2014). At the IAU-ACUP seminar, the importance of doctoral education and its relevance for African higher education institutions was not questioned. Interestingly, however, the seminar report concluded that 'while the status of the PhD is recognised in Africa, African society does not know how to evaluate the competencies of PhD holders nor the relevance of what they can contribute to society' (IAU-ACUP 2012: 20).

The IAU-ACUP report, in part, was informed by an IAU study that provided a broad overview and comparisons of six African universities[1] in terms of programmes, enrolments, graduation and funding. The main conclusion of the study was the following (IAU 2012: 43):

> *The project was found to be a valuable experience and an 'eye opener' to participating institutional teams and university leadership as well. Indeed if most leaders and main doctoral programme actors thought they knew what was at stake, many reported to have been surprised by what the self-assessment exercise and interim report brought to the fore. Many reported that they thought that their doctoral programmes were doing well and realize that there is considerable space for improvement.*

Africa is littered with hasty studies such as the one referred to above, which are usually followed by high-profile conferences with grand declarations and recommendations. Considering the general development aid funding context, the challenge is to undertake more systematic, research-informed studies to diagnose problems in a way that avoids hasty prescriptions. The lack of implemented reform in Africa is often lamented as a problem of 'good policy but poor implementation', which is then attributed to a lack of capacity or funds. However, the difficulty actually originates with superficial understandings of the problem, followed by declarations rather than policy, as well as a lack of consensus on what to do. All of this gives rise to inevitable implementation disappointment.

Debates and developments in doctoral education in South Africa

More PhDs to produce knowledge and address the quality problem in South Africa

Over the past two decades, the dominant debate in higher education in South Africa (as in many other parts of the world) has been about access and equity. In particular, the emphasis

1 The six universities included Kenyatta in Kenya, Doula in Cameroon, Ilorin in Nigeria, Science and Technology of Benin, Gaston Berger in Senegal, and the National University of Rwanda.

has been on how to increase the number of high school graduates entering universities and how to address racial and gender imbalances in the higher education system. Access, in this context, was not seen as massification or as part of a development model, but rather as a mechanism for redressing the imbalances of the past by using a model of planned growth. This approach succeeded in increasing the percentage of head count black[2] students in universities (from 53% in 1996 to 70% in 2012) but it hardly affected the overall gross participation rates of African students, which only increased from 10% to 16% over the same period (Cloete 2014).

A shift in discourse from equity to development became apparent in the South African Ministry of Planning's national development planning process and subsequent proposals. Central to a highly productive, globally connected economy are high-level skills and extensive participation in higher education. The first draft of the new *National Development Plan (NDP): Vision for 2030* embraced the knowledge economy argument; in fact, it was so enthusiastic about knowledge production that it declared that 'knowledge production is the rationale of higher education' (NPC 2011: 271). This is indeed a radical departure from the traditional role of higher education in Africa, namely the dissemination, through teaching, of knowledge from elsewhere. It is also a significant departure from the post-1994 focus on higher education as an equity instrument to provide mobility for the historically disadvantaged (Cloete et al. 2011).

An important reason provided in the NDP for the focus on the doctorate is the perception of poor quality in the higher education system as a whole as well as the importance of staff qualifications for ensuring quality (NPC 2012: 318). As such, the basic argument underlying the *NDP 2030* runs as follows: raise the qualifications of staff – in other words, increase the number of academics with PhDs – and the quality of the student outcomes will improve. It is also assumed that this will significantly improve throughput, the capacity to supervise higher degrees and, ultimately, the research productivity of the sector. In short, as Muller (2013: 2) observes, 'quality defined as having a PhD is seen by the *NDP 2030* as being the key that will unlock a virtuous cycle of effects.'

In a more targeted planning approach than that of the national education ministry, the National Planning Commission, in Chapter 9: Improving Education, Training and Innovation in the *NDP 2030*, started with an empirical, rather than an ideological, statement: 'South Africa has a differentiated system of university education, but the system does not have the capacity to meet the needs of the learners' (NPC 2012: 318). It then presented a somewhat muddled mixture of system features. However, unlike any previous policy document, it made a number of bold proposals for universities and for the doctorate in particular (ibid.: 318–320):

- Improve the qualifications of higher education academic staff from the current 39% to 75% (this is the number one recommendation).
- Produce more than 100 doctoral graduates per million by the year 2030. South Africa

2 Following South African convention, the term 'black' is used in this chapter to refer to African, Coloured and Indian race groupings.

currently produces 28 per million, which is low by international standards.
- To achieve the target of 100 per million, the country needs more than 5 000 doctoral graduates per annum, as against the current figure of 1 878.
- If South Africa is to be a leading innovator, the majority of these doctorates should be in science, engineering, technology and mathematics.
- Increase the number of masters and PhD students: by 2030 over 25% of university enrolments should be at the postgraduate level.
- Strengthen universities that have an embedded culture of research and development.
- Provide performance-based grants to develop centres or networks of excellence within and across institutions. International exchange partnerships should be encouraged.

The *NDP 2030* went further by stating the aim of producing more than 100 doctoral graduates per one million of the population by 2030. Roughly speaking, this means that the annual production of doctoral graduates will have to increase from 1 420 per annum (in 2010) to 5 000 per annum in 2030 (NPC 2012: 319). The *NDP 2030* acknowledged that there was 'a shortage of academics' and that just over a third possessed a PhD – qualifying them to supervise a PhD (ibid.: 317). Where will this extra supervisory capacity come from, let alone the increased number of PhD students? The *NDP 2030* identified three new sources (ibid.: 319):

- Local institutions with 'embedded research capacity' that should, in return for recognition of this niche, assist with supervision at other universities that only focus on teaching and learning;
- Partnerships with industry and commerce; and
- Partnerships and exchanges with international universities.

Following the *NDP 2030* report, the Minister of Science and Technology, Naledi Pandor, in her 2014 budget speech, announced that the government would need to set aside an additional USD 580 million a year to meet the NDP target of producing 5 000 PhD students annually (Kahn 2014). The Minister also argued that South Africa lacks research supervision capacity and that the doctoral student pipeline is too narrow. As such, additional measures would include providing support to researchers who are capable of supervising postgraduate students, and creating appropriate incentives for students to remain in the system up to doctoral level. She also announced that the Department of Science and Technology (DST) had begun investing in emerging researchers through postdoctoral and research career-advancement fellowships. The Minister further reported that the DST would invest USD 50 million in a coordinated approach to science education, science awareness and science communication, and that the DST/Treasury-supported internship programme had, during 2012/2013, supported 1 341 unemployed graduates in work experience in science, engineering and technology institutions. Of these, 58% had been absorbed into permanent employment in the same institutions while the others had found employment

elsewhere (ibid.). Another ambition of the DST was to increase the proportion of black researchers from 28% in 2014 to 40% in 2016/2017 and to raise the proportion of women from 36% to 50% (Wild 2014).

The drive towards the internationalisation of PhDs in South Africa

At the national level in South Africa, the internationalisation of postgraduate enrolments is advocated by various policy documents. The *National Plan for Higher Education* (MoE 2001: 2.8.1.2), for instance, recommended that institutions increase recruitment of students from the Southern African Development Community (SADC), especially at the postgraduate level. Similarly, the *NDP 2030* envisaged South Africa establishing itself as a hub for higher education and training in the region that is capable of attracting a significant share of the international student population (NPC 2012). The *White Paper for Post-School Education and Training* (DHET 2013a: 40) noted that hosting large numbers of international students, especially SADC students, represents a major contribution by South Africa to the development of the subcontinent. It also highlights the fact that all the countries in the SADC region are interdependent and that the strengthening of Southern African economies will inevitably result in the improvement of South Africa's own economy.

The simple reality is that if the South African higher education system wants even remotely to achieve the target of 5 000 or more PhD graduates per annum, then the system will have to enrol and graduate more students – from South Africa, the rest of Africa and the rest of the world!

There are a number of approaches to or 'models' for attracting international students.[3] The first model, the 'internationalisation drive', is based on information and/or contacts from international offices at universities with strong internationalisation programmes. In South Africa, the Nelson Mandela Metropolitan University (NMMU) is probably the prime example. In their internationalisation strategy, they propose that each university programme and faculty must have internationalisation targets, with enrolment plans and an agreed-upon target indicator (for 2014 it is 9% overall) (NMMU 2014: 6).[4]

Almost diametrically opposed to the 'internationalisation drive' approach is the 'traditional academic' model in which an ambitious student approaches a high-status academic for supervision. This model is probably much less common primarily because students from the rest of Africa who have not studied in South Africa would not have the tacit knowledge about or the necessary connections within the system. Another version of this is where institutions (or even governments) in other African countries identify a South African academic department and negotiate a relationship, often with funding and support from both sides.

3 Currently, there are no statistics about which model attracts what number of students.

4 It could be argued that the NMMU model is based on the Australian approach to recruiting East Asian students. In this, the two components include aggressive advertising, and having an office for the director of the international office that is only marginally smaller than that of the vice-chancellor (ostensibly to show foreigners how important internationalisation is).

A third internationalisation model could be called 'capacity-building doctoral education'. There are two types of such capacity-building approaches at the University of Stellenbosch. The first is the Partnership for Africa's Next Generation of Academics (PANGeA), a collaborative network of leading African universities that is developing research capacity and confidence in order to bring African expertise to bear on Africa's challenges.[5] The network aims to develop research capacity on site; offer supervision for and participate in collaborative doctoral programmes, research programmes focused on Africa and joint doctoral degree programmes; and offer three-year full-time residential scholarships. The funding for this programme comes from Stellenbosch University and partner institutions (which provide sabbatical and salaries during absence), as well as foreign donors.[6] Students register for this programme at Stellenbosch University, or jointly with a partnership institution, with the requirement that students return to the partnership institution once they have completed their degrees. From the three cohorts that completed in 2012–2014, all 26 PANGeA graduates have resumed their academic posts at the partner universities. This suggests that the PANGeA initiative could be a 'safeguard against the brain drain to the south of the continent'.[7] However, this initiative has not been without challenges: thus far no joint degrees have been issued and there has been limited research cooperation between senior professors.

The second doctoral capacity-building programme at Stellenbosch University, the African Doctoral Academy, focuses on skills and training. Strategically, the Academy aims to support, strengthen and advance doctoral training and scholarship on the continent across disciplines, through scholarship workshops, two-month summer schools, accredited supervision courses, research methodology and proposal-writing workshops, and mentorship. This programme is largely funded by foreign donors and the January 2015 summer school will have about 250 participants from all over Africa. In contrast to the PANGeA programme, these students are registered at their home institutions and not at Stellenbosch University.

The above is just a brief summary of some of the programmes and approaches adopted by institutions to attract international students. A more comprehensive survey/study of these types of programmes across South African universities would indeed be very informative.

Data on doctoral production in South Africa: 2000–2012

The most reliable data on doctoral education in South Africa is available from 1996, while that for international students is from 2000 – the earliest date for which there is audited data on the

5 PANGeA website: www.pangeaonline.org. The founding partners are the universities of Stellenbosch, Botswana, Dar es Salaam, Makerere, Malawi and Nairobi.

6 Personal communication, Cindy Steenekamp, Centre for International and Comparative Politics, Stellenbosch University (4 December 2014).

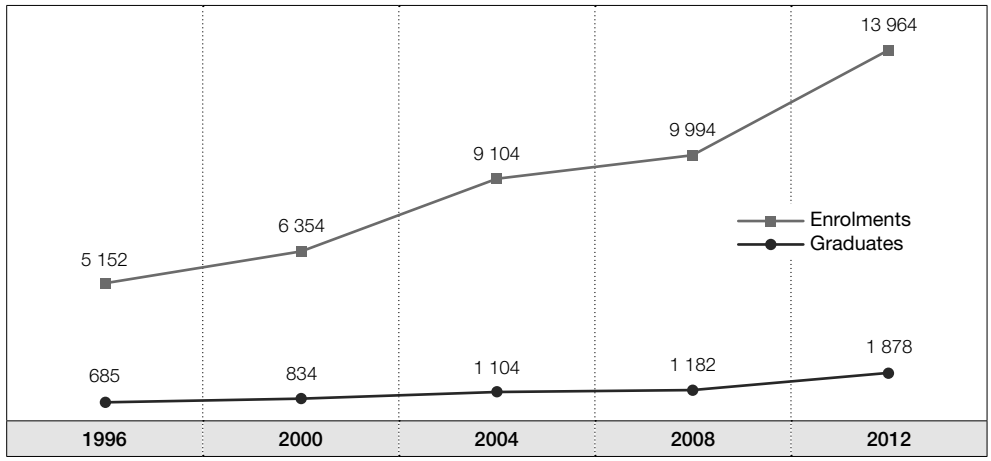
7 Personal communication, Cindy Steenekamp, Centre for International and Comparative Politics, Stellenbosch University (4 December 2014).

nationality of students in the South African Higher Education Management and Information System (HEMIS). Thus, the analysis of doctoral enrolments in South Africa presented here covers the period 1996–2012, while most of the international trend analyses will cover the period 2000–2012.

The four-year time periods from 2002-2012 roughly correspond with important policy moments in the South African system. A benchmark year was 2000, when the Council on Higher Education launched the *Towards a New Higher Education Landscape* report (CHE 2000). This report prompted the Ministry of Education's *National Plan for Higher Education* (MoE 2001) which, amongst others, led to mergers that reduced the South African system from 36 to 23 universities. During 2004, a new funding framework was introduced that included an important principle of using funding as a steering lever, which also affected the newly merged institutions.[8] This framework was fully implemented by 2008, which makes it a key year for looking at possible steering effects.

Figure 5.1 below shows that doctoral enrolments increased from 5 152 in 1996 to 13 964 in 2012. This was a 6.4% average growth per annum, which was slightly faster than the growth in masters enrolments (5%), and considerably faster than the average undergraduate growth (3%). There was a surge in doctoral enrolments between 2000 and 2004, from 6 354 in 2000 to 9 104 in 2004, an increase of 2 750 (or 43%).

Figure 5.1 PhD enrolments and graduates (1996–2012)



Compiled by Charles Sheppard
Sources: DoE (1999) and DHET (2013b)

8 While the funding framework was introduced during 2003/2004, it only became fully functional during the 2007/2008 financial year.

Doctoral graduates increased from 685 in 1996 to 1 878 in 2012. Overall, therefore, graduates increased by 6.5% on average per annum, compared to the 6.4% average annual growth rate of enrolments. The possible effects of the full introduction of government funding incentives, which were designed to encourage postgraduate studies,[9] can be seen in the enrolment increases that occurred between 2008 and 2012. During this period, PhD enrolments and graduates grew at an average annual growth rate of 8.7% and 12.3% respectively.

Doctoral enrolments and graduations by nationality

Prior to 1994, South Africa had a very small number of international students. The fact that in 2000 the DHET started recording nationality in HEMIS signals that a change was occurring. The data in this analysis are classified as follows:

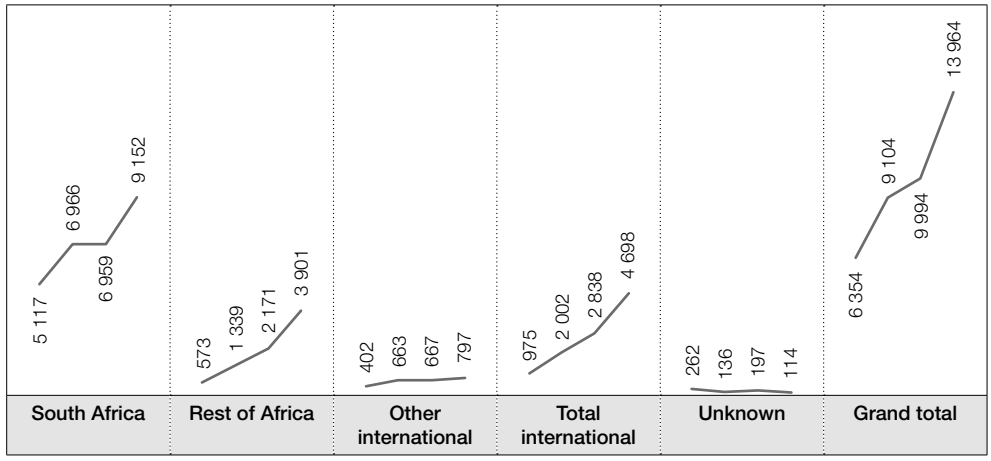
- South African students (those with a South African identification number); and
- International students, who are further divided into
    - Students from the rest of Africa (i.e. those who are from Africa, but not from South Africa); and
    - Other international students (i.e. those who are neither from South Africa nor from other African countries). As will be seen, on the whole this group constitutes a very small proportion of the total group of international students.

Overall, for the period 2000–2012, doctoral enrolments increased from 6 354 to 13 964, a growth of 7 610 (120%) (see Figure 5.2). South African enrolments increased from 5 117 to 9 152 (a growth of 79%). This compared to an increase from 975 to 4 698 (382%) among all international students and, within this, enrolments among students from the rest of Africa increased from 573 to 3 901 (581%).

For South Africans, the annual growth rate of 5% for enrolments was slightly below the overall annual growth of 6.8% for the cohort. By comparison, the annual growth rate of 14% for all international students was almost two-and-a-half times that for South Africans and, within this, the growth rate of 17.3% for students from the rest of Africa was three-and-a-half times more than for South Africans (see Figure 5.3). Thus, while by 2012 the South African students still comprised more than half the total enrolments (9 152 out of 13 964), enrolments among all international students were growing at almost three times (14% versus 5%) the rate of the South Africans.

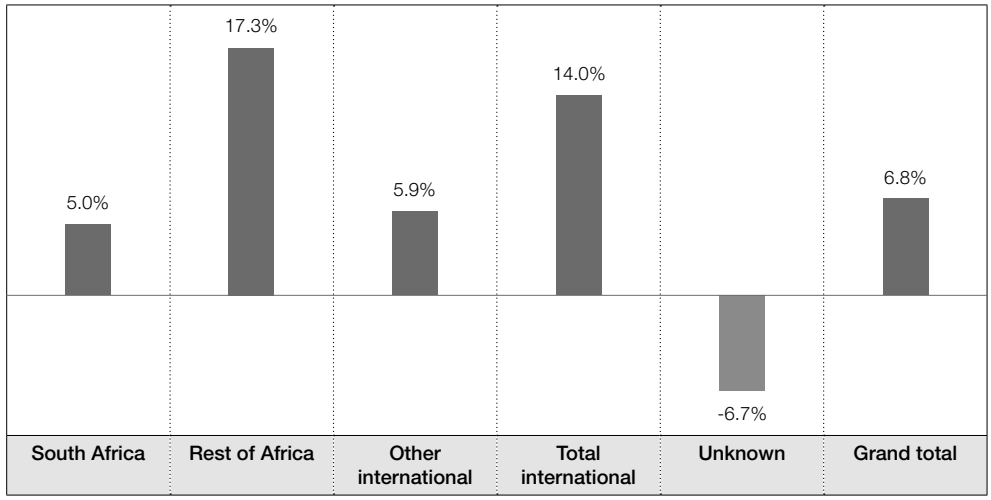
9 For enrolment funding purposes, fields of study are divided into four groupings, with education, law, psychology and public management in Group 1, and agriculture, health sciences and performing arts in Group 4. Upon graduation, the total funding per graduate ranges from around USD 45 000 for Group 1 graduates to USD 65 000 for Group 4 graduates. Universities receive the highest funding for PhD graduates, which is a substantial incentive to produce more PhDs.

Figure 5.2 PhD enrolments by nationality (2000, 2004, 2008, 2012)



Compiled by Charles Sheppard
Source: DHET (2013b)

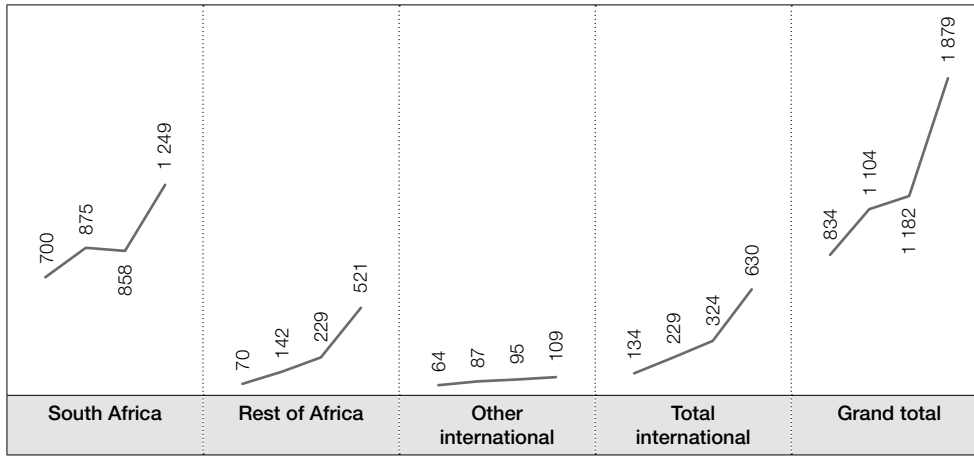
Figure 5.3 Average annual growth rate of PhD enrolments by nationality (2000–2012)



Compiled by Charles Sheppard
Source: DHET (2013b)

Overall, for the period 2000–2012, doctoral graduates increased from 834 to 1 879, a total growth of 125% (see Figure 5.4). The number of South African graduates increased from 700 to 1 249 (78%). International graduates increased from 134 to 630 (370%) and, within this, graduates from the rest of Africa increased from 70 to 521 (644%).

Figure 5.4 PhD graduates by nationality (2000, 2004, 2008, 2012)



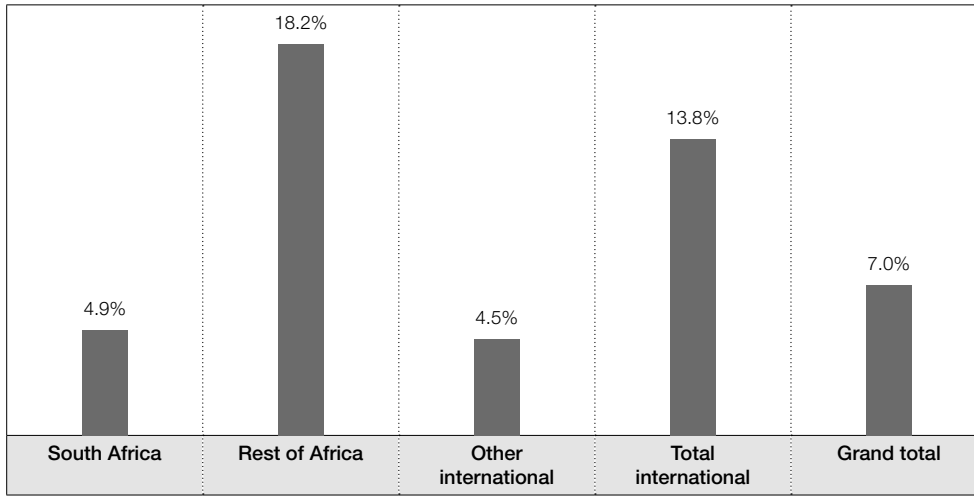
Compiled by Charles Sheppard
Source: DHET (2013b)

An analysis of doctoral graduates by nationality for 2012 illustrates that, similar to enrolments (65.5%), South Africans of all races constituted 66.5% (1 249) of all doctoral graduates, while international students constituted a 33.5% (630) share.

For graduates, the overall growth rate of 7% (see Figure 5.5) was very similar to that of enrolments (6.8%), implying that the same efficiency ratio had been maintained. For South Africans, the annual growth rate of 4.9% for graduations was slightly below the overall annual growth of 7% for the cohort (see Figure 5.5). The annual growth rate of 13.8% for all international students was more than double that of South Africans, while the growth rate of 18.2% for students from the rest of Africa was three-and-half times more than for South Africans. Similar to the trends in enrolments, while by 2012 the South Africans still comprised around two thirds (1 249 out of 1 879) of the total graduates, the number of international graduates was growing at almost three times the rate (13.8% versus 4.9%) on average per annum.

In terms of efficiency, a cohort analysis was performed in which individual students were tracked based on records extracted from the HEMIS database. Enrolments and graduates were linked through cohort-tracking, starting with 2006. This allows for accurate measures and comparisons of the proportion of doctoral students who do not complete their studies, as well as the share of students who eventually graduate. For the 2006 cohort, the results show that after seven years, the completion rate for all international students was 47%, as compared to 45% for South African students. The tendency for international doctoral students to complete more quickly than national students has also been observed in the United States and Norway (Cloete & Mouton forthcoming).

Figure 5.5 Average annual growth rate of PhD graduates by nationality (2000–2012)



Compiled by Charles Sheppard
Source: DHET (2013b)

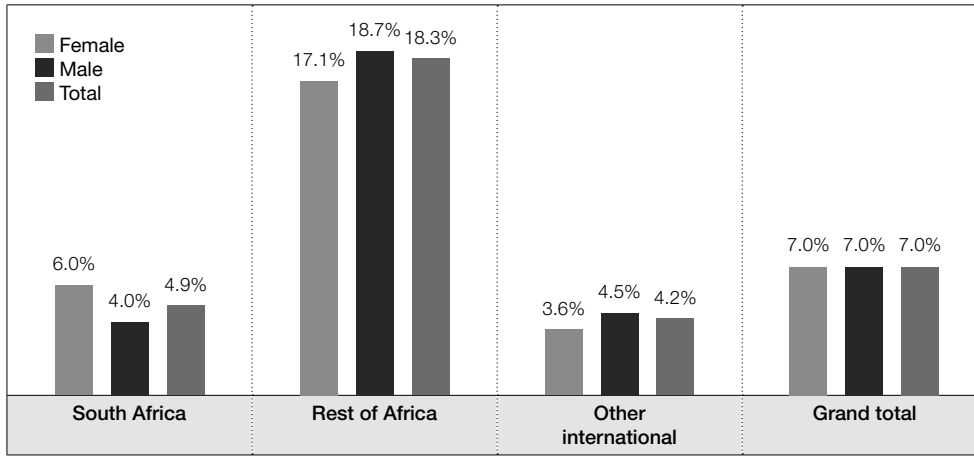
Gender

In total, over the period 2000–2012, the gender distribution remained the same with an average annual growth rate of 7% for males and females (see Figure 5.6). In both 2000 and 2012, 42% of the PhD graduates were female. The biggest change was amongst South Africans where the number of female PhD graduates increased at an average annual rate of 6% compared to 4% among male graduates. This translated into female PhD graduates increasing their share from 45% to 50% over the period 2000–2012. Among the students from the rest of Africa, the number of male PhD graduates increased at a higher rate over this period (18.7%) compared to female graduates (17.1%). The percentage of female graduates from the rest of Africa declined from 30% in 2000 to 27% in 2012. Similarly, the share of females from the international group of PhD graduates declined from 30% to 28% over the same period.

PhD graduates by nationality and field of study

As indicated in Figure 5.1 above, the total number of PhD graduates increased from 834 to 1 878 over the 2000–2012 period, which represented a total increase of 125% and an average annual growth rate of 7%. Disaggregating the data by nationality for this period reveals that graduates from the rest of Africa and other countries combined increased at a much higher rate (total increase of 320%, average annual growth rate of 13%) than the South African PhD graduates (total increase of 80%, average annual growth rate of 5%).

Figure 5.6 Average annual growth rates by nationality and gender (2000–2012)



Compiled by Charles Sheppard
Source: DHET (2013b)

In 2000, the majority of graduates in both the South African (39.6%) and international (43%) groups were in the humanities. This was followed by the natural sciences with 20.9% South African and 27.8% international graduate groups in the same year. By 2012 these percentages had switched around: of the South African graduates, 31.7% were in the natural sciences compared to 28.8% in the humanities and social sciences, and for the international graduates, 39.9% were in the natural sciences and 27.7% in the humanities and social sciences. Both groups showed a decline in the percentage of graduates in the health sciences (South Africans from 12.3% to 11.1%, international from 13.9% to 8%) and in education (South Africans from 16.3% to 12.2%, international from 8.2% to 7.7%).

The percentage of graduates in business, economic and management sciences increased for both groups: from 4% to 8.4% for South Africans, and from 0.6% to 9.2% for international graduates. Engineering graduates also increased as a percentage of the total graduates for both groups (South African from 7% to 7.8%; international from 6.3% to 8%). It is thus evident that both the South African and international graduates have increased in the natural sciences, engineering and technology, business, economic and management sciences at the expense of graduates produced in the humanities and social sciences.

University differentiation in internationalisation

South Africa has a university system that is differentiated in terms of type of institution, performance in terms of knowledge production and, as was suggested in the section on foreign student policy above, differences in approach to internationalisation. Table 5.1 shows that the University of Cape Town produced the most doctorates during the post-2000 period,

Table 5.1 International PhD graduates per university (2000–2012)

Institution	2000	2004	2008	2012	Total for all years from 2000–2012	Accumulative percentage
Cape Town	25	33	51	80	676	14.9%
Stellenbosch	12	17	34	75	559	27.2%
KwaZulu-Natal	13	25	39	70	554	39.4%
Pretoria	8	38	45	68	497	50.3%
South Africa	31	27	28	62	467	60.6%
Witwatersrand	17	29	40	48	414	69.7%
Western Cape	4	9	16	33	224	74.6%
Nelson Mandela	1	4	10	30	215	79.3%
North West	2	7	10	30	207	83.9%
Fort Hare	–	2	7	25	166	87.5%
Rhodes	7	14	10	24	142	90.7%
Johannesburg	3	4	11	23	121	93.3%
Tshwane	–	–	4	22	97	95.4%
Free State	10	12	12	14	70	97.0%
Cape Peninsula	–	–	3	11	40	97.9%
Zululand	–	1	3	5	36	98.7%
Central	1	2	–	3	28	99.3%
Limpopo	–	3	1	3	10	99.5%
Vaal	–	–	–	2	7	99.6%
Durban	–	–	–	1	6	99.8%
Venda	–	1	–	1	6	99.9%
Walter Sisulu	–	1	–	–	4	100.0%
TOTAL	**134**	**229**	**324**	**630**	**4 546**	

Compiled by Charles Sheppard
Source: DHET (2013b)

followed closely by Pretoria, KwaZulu-Natal, Witwatersrand, South Africa and Stellenbosch. These six universities produced 70% of the international PhD graduates. However, these are total numbers in institutions that vary considerably in size. If adjusted for overall number of students, Cape Town, Stellenbosch and Rhodes University do the best.

Table 5.1 also shows different patterns in growth. Of the high 'internationalisers', Pretoria started rather slowly (with eight) in 2000, but then accelerated by growing by 700%, while the University of South Africa remained stagnant during 2004 and 2008, before doubling their 2000 numbers in 2012. Of the historically disadvantaged institutions, Western Cape (four in 2000 to 33 in 2012) and Fort Hare (two in 2004 to 30 in 2012) have also become part of the internationalisation process.

Table 5.2 Top 20 countries of origin of the 2012 international PhD graduates

No.	Country	2012	Accumulative percentage
1	Zimbabwe	142	22.5%
2	Nigeria	76	34.6%
3	Kenya	43	41.4%
4	Uganda	29	46.0%
5	Ethiopia	23	49.7%
6	United States	23	53.3%
7	Cameroon	19	56.3%
8	Ghana	19	59.4%
9	Tanzania	18	62.2%
10	Zambia	17	64.9%
11	Democratic Republic of Congo	15	67.3%
12	Lesotho	15	69.7%
13	Malawi	15	72.1%
14	Sudan	15	74.4%
15	India	13	76.5%
16	Mozambique	13	78.6%
17	Namibia	13	80.6%
18	Germany	11	82.4%
19	Botswana	10	84.0%
20	Rwanda	10	85.6%

Compiled by Charles Sheppard
Source: DHET (2013b)

Country of origin

In 2012, from a total of 1 878 graduates, 630 (33.6%) were international students from 59 countries. Table 5.2 lists the top 20 countries and shows that ten countries contributed 64% of the total. Zimbabwe with 142 (22.5%) topped the list, followed by Nigeria (76), Kenya (43), Uganda (29) and Ethiopia (23). The only country in the top ten that is not from the African continent was the United States with 23 (3.7%). Twenty-one countries only contributed one graduate per country. In terms of the BRICS countries, India (15), China (7) Russia (3) and Brazil (1) do not yet feature as prominently as much of the cooperation hype would suggest. For a full list see Appendix Table A5.1.

Notably, in 2012, the total number of international graduates was 630, of which 521 (82.7%) were from the rest of Africa and only 109 (17.3%) were from countries outside of Africa.

Data on African PhDs in South Africa

In post-apartheid South Africa, transformation in higher education was framed by the Nelson Mandela-appointed National Commission on Higher Education (NCHE 1996). The three main pillars of reform focused on increasing particpation in higher education and in governance, and on greater relevance. However, equity, gender and particularly race constituted the dominant discourse. Although equity was dominant in the NCHE report, there was no unanimity on how to redress it (Cloete 2014).

In terms of formal policy, the *Education White Paper 3: A programme for the transformation of higher education* (DoE 1997: 2.91, 2.94) emphasised the importance of increased access of black (i.e. African, Coloured and Indian) and female students to masters, doctoral and postdoctoral programmes, as a means of increasing the pool of researchers and improving the demographic representation of staff in higher education. Furthermore, recommendations of the *NDP 2030* included increasing the number of African and female postgraduates, especially at the doctoral level, to improve research and innovation capacity and to normalise staff demographics (NPC 2012: 327). The *NDP 2030* also envisaged South Africa establishing itself as a regional hub for higher education and training, capable of attracting a significant share of the international student population (ibid.: 319).

Figure 5.7 shows South African doctoral graduates for 1996–2012 according to race groupings. The major change was in African graduates whose numbers increased from only 58 in 1996 to 821 in 2012, compared to 816 white graduates, 142 Indian graduates and 100 Coloured graduates. The proportion of African doctoral graduates increased from 8% to 44% while the proportion of white graduates declined from 86% to 43%. The demographic profile of graduates has changed drastically in line with the demographics for enrolments. In 2010, African enrolments (5 065) first exceeded white doctoral enrolments (4 853) and, in 2012, African graduates (821) exceeded white graduates (816) for the first time in South Africa's history.

There were also changes in the gender balance over this period where the proportion of female graduates increased from 35% in 1996 to 42% in 2012, although this change was not as dramatic as the race reversal between African and white doctoral graduates highlighted above.

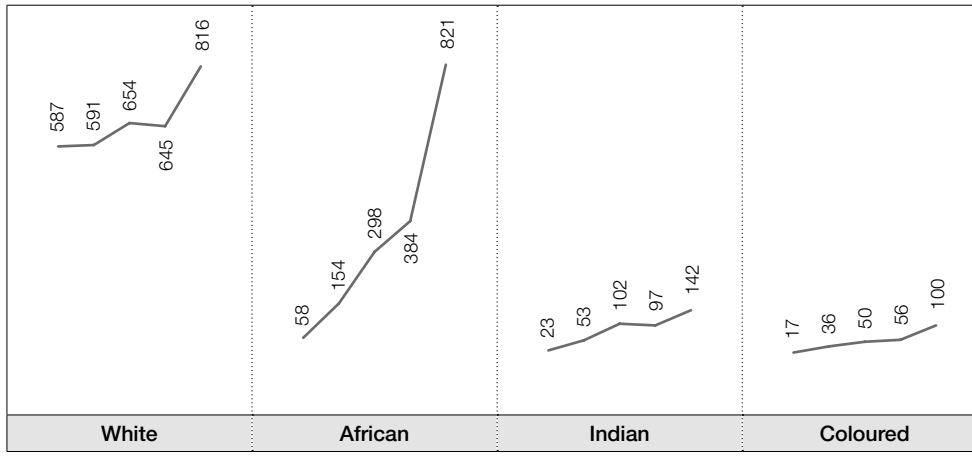
South African-Africans and the rest of Africa

Despite all the policy attention on equity, in 2013 there was once again a heated debate, referred to as 'passionate commentaries' by Govinder et al. (2014), in the *South African Journal of Science* and the national press, about a lack of transformation. The Equity Index attempted to assess the racial and gender demographics of each university against national demographics, using a mathematical formula to attribute numerical distances between pairs of points in a multidimensional space (ibid.).[10] Part of the debate was that Govinder et al.

10 For a more detailed discussion, see Cloete (2014) and Govinder et al. (2014).

had not included 'foreigners' (code word for Africans from the rest of Africa) in their equity index for students, but had included their publications under staff. Govinder et al. (ibid.: 2) concluded in their response that they 'acknowledge that there is no agreement on if and how Non-South African (blacks) should be included in the equity index (or indeed in any discussion incorporating demographics in South Africa).'

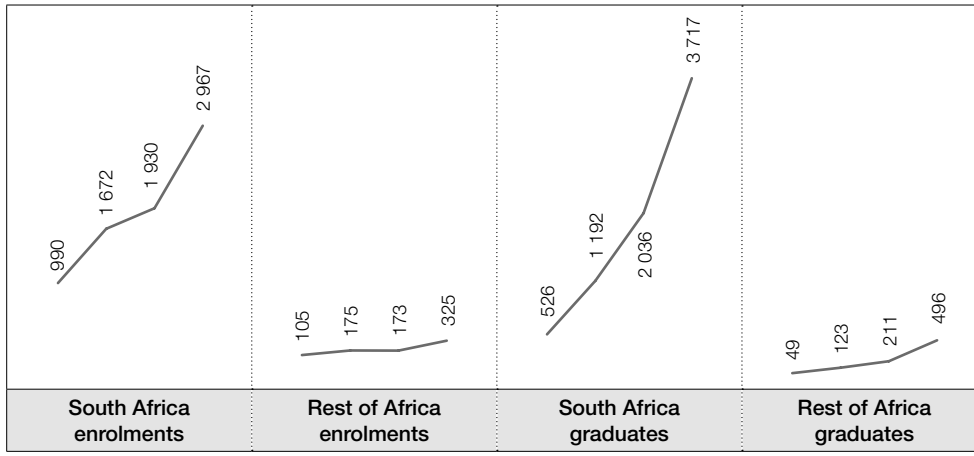
Figure 5.7 South African doctoral graduates by race (1996, 2000, 2004, 2008, 2012)



Compiled by Charles Sheppard
Sources: DoE (1999) and DHET (2013b)

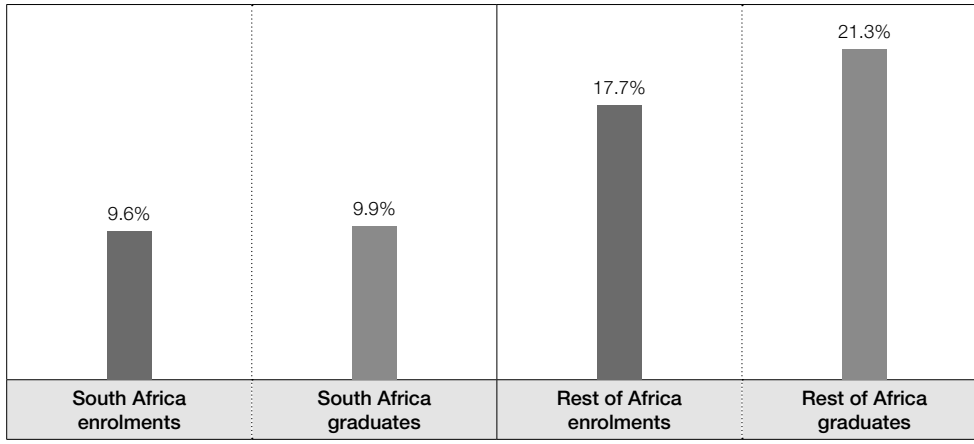
Nevertheless, the Africans in South African doctoral education come from the continent as a whole and not just South Africa. Figure 5.8 below shows that in 2000 the number of South African-African enrolments (990) were almost ten time those of the rest of Africa (105). By 2012, there were 750 more enrolments and 171 more graduates from the rest of Africa than there were among SA-Africans. A notable change happened in the period 2004–2008 when the SA-African enrolments increased by 258 (15%) and the rest of Africa by 844 (71%). The annual growth rate, which is a much stronger indicator than overall growth percentage, shows that on an annual basis among students from the rest of Africa doctoral enrolments grew at 17.7% and graduates at 21.3%. This was more than double the rate for SA-Africans for which the average annual growth rates were 9.6% for enrolments and 9.9% for graduates.

Figure 5.8 South African-African and rest of Africa enrolments and graduates (2000, 2004, 2008, 2012)



Compiled by Charles Sheppard
Source: DHET (2013b)

Figure 5.9 South African-African and rest of Africa enrolments and graduates: Average annual growth rate (2000–2010)



Compiled by Charles Sheppard
Source: DHET (2013b)

Female African doctorates

It is beyond the scope of this chapter to explore the profile of female African PhD enrolments and graduations in any great detail; this will be dealt with more extensively in the forthcoming book by Cloete and Mouton. It is, however, worth noting some key trends over the 2000–2012 period.

With regard to enrolments, there were significant increases among African females from South Africa and females from the rest of Africa: the SA-African enrolments increased from 336 in 2000 to 1 306 in 2012 (a total increase of 288%), while the female enrolments from the rest of Africa increased from 114 to 1 034 (a total increase of 807%). The annual growth rate for females from the rest of Africa was 20.2%, almost twice as fast as for SA-Africans (12%). In terms of graduations, the number of SA-African female graduates increased from 26 in 2000 to 104 in 2012 (a 300% increase); by contrast, graduations amongst females from the rest of Africa increased from 14 to 136, which is a total increase of 871%. The annual growth rate differences were very similar to those for enrolments: 12.2% for SA-African females and 20.9% for females from the rest of Africa.

The enrolments of African female PhDs in South Africa and the rest of Africa have increased at higher rates than for males: 12% on average for SA-African females compared to 8.1% for SA-African males; and 20.2% for females from the rest of Africa compared to 16.9% for their male counterparts. Whilst the growth in enrolments was the highest among females from the rest of Africa, males from the rest of Africa improved their graduation efficiency the most, with an average annual growth rate of 21.5%.

Finally, with regard to field of study, the majority of SA-African female students obtained their PhD degrees in the humanities and social sciences (28.8%) and the natural sciences (22.1%), while the majority of female graduates from the rest of Africa obtained their PhD degrees in the natural sciences (38.2%) and the humanities and social sciences (32.4%).

Summary of data

Trends among PhD students from South Africa, the rest of Africa and other countries

- Enrolments:
  - In the post-apartheid period in South Africa, doctoral enrolments overall increased by 171% from 5 152 in 1996 to 13 964 in 2012 (the 6.4% average growth per annum was considerably faster than the average undergraduate growth of 3%).
  - In terms of the trends in the internationalisation of PhDs in South Africa, overall for the period 2000–2012,[11] doctoral enrolments increased from 6 354 to 13 964, a growth of 7 610 (120%). South African enrolments increased from 5 117 to 9 152

11 Owing to the availability of data, the trends in the internationalisation of PhDs in South Africa can only be analysed from the year 2000 onwards.

(a growth rate of 79%). This compared to an increase from 975 to 4 698 (382%) among international students and, within this, enrolments among students from the rest of Africa increased from 573 to 3 901 (581%).

- In 2012, the enrolments among South African students were still contributing to almost half the total enrolments (9 152 out of 13 964), although enrolments among all international students were growing at almost three times (14% versus 5%) the rate of the South Africans.

- Graduates:
  - An analysis of doctoral graduates by nationality for 2012 illustrates that, similar to enrolments (65.5%), South Africans of all races constituted 66.5% (1 249) of all doctoral graduates, while international students constituted a 33.5% (630) share.
  - Overall for the period 2000–2012, doctoral graduates increased from 834 to 1 879, a total growth of 125%. The number of South African graduates increased from 700 to 1 249 (78%). International graduates increased from 134 to 630 (370%) and, within this, graduates from the rest of Africa increased from 70 to 521 (644%).
  - The fastest growing group of graduates was students from the rest of Africa, with an average annual growth rate of 18.3%, which was three-and-a-half times faster than the South African group.
  - In 2012, the South Africans were still contributing around two thirds (1 249 out of 1 879) of the total graduates, but the number of international graduates was growing almost three times faster (13.8% versus 4.9%) on average per annum.
  - Seven years after registration, the completion rate for all international students was 47%, as compared to 45% for South African students.
- Graduations by field of study:
  - Over the period 2000–2012, there was an interesting switch in terms of field of study between the South African and international PhD graduates: in 2000, the majority of South Africans (39.6%) were in the humanities but by 2012, the majority (31.7%) was in the natural sciences. Among the international students, in 2000, 43% of the PhD graduates were in the humanities, but by 2012, this had shifted to 39.9 % in the natural sciences compared to 27.7% in the humanities and social sciences.
  - Overall, the number of both the South African and international graduates increased in the natural sciences, engineering and technology, business, economic and management sciences at the expense of graduates produced in the humanities and social sciences.
- Institutional, country of origin and race differentiation:
  - The university system in South Africa is notably differentiated in terms of producing doctoral graduates. The University of Cape Town (676) produced the most international doctorates during the post-2000 period, followed by Stellenbosch (559), KwaZulu-Natal (554), Pretoria (497), South Africa (467) and Witwatersrand

(414). Together, these six universities produced 70% of the international PhDs for the 2000–2012 period.

- In 2012, students from 59 countries around the globe obtained a PhD in South Africa. Zimbabwe (142), Nigeria (76), Kenya (43), Uganda (29) and Ethiopia (23) produced 50% of the international PhD graduates, with the United States (23) in sixth place.
- In 2010, among the South African students, African enrolments (5 065) first exceeded white doctoral enrolments (4 853) and, in 2012, African graduates (821) for the first time in the history of South Africa exceeded white graduates (816).

Trends amongst African PhD students from South Africa and the rest of Africa

- Enrolments:
  - In 2000, the number of SA-African enrolments (990) was almost double those of the rest of Africa (526), but by 2012 there were (750) more enrolments from the rest of Africa (3 717) than the SA-African (2 967) enrolments. The annual growth rate was almost twice as fast for students from the rest of Africa (17.7% versus 9.6%).
  - With regard to gender, the female SA-African enrolments increased from 336 in 2000 to 1 306 in 2012, a total increase of 288%, while the enrolments among females from the rest of Africa increased from 114 to 1 034, a total increase of 807%. The annual growth rate for female PhD enrolments for the rest of Africa was 20.2%, almost twice as fast as for South Africans (12%).
  - The enrolments of African female PhDs in South Africa and the rest of Africa have increased at higher rates than for their male counterparts: 12% on average for African females in South Africa compared to 8.1% for African males; and 20.2% for females from the rest of Africa, compared to 16.9% for males.
- Graduates:
  - In 2000, there were 105 SA-African graduates, compared to 49 from the rest of Africa. By 2012, graduates from the rest of Africa totalled 496, against the 325 among the SA-Africans. The average annual growth rate was 9.9% for SA-Africans compared to the 21.3% for the rest of Africa.
  - The number of SA-African female graduates increased from 26 in 2000 to 104 in 2012 (a 300% increase); by contrast, female graduates from the rest of Africa increased from 14 to 136 (a total increase of 871%). The annual growth rate differences were very similar to those for enrolments: 12.2% for SA-African females and 20.9% for females from the rest of Africa.
  - Whilst the growth in graduations was the highest for females from the rest of Africa, males from the rest of Africa improved their graduation efficiency the most, with an average annual growth rate of 21.5%.
- Graduations by field of study:
  - The majority of SA-African female students obtained their PhD degrees in the

humanities and social sciences (28.8%) and the natural sciences (22.1%), while the majority of females from the rest of Africa obtained their PhD degrees in the fields of natural sciences (38.2%) and the humanities and social sciences (32.4%).

South Africa as a PhD hub?

There are three key factors that contribute positively to the possibility of South Africa becoming a PhD hub for the continent. The first, highlighted earlier in this chapter, is the considerable investments the South African government intends to make towards increasing doctoral production; improving supervisory capacity among academics; providing incentives for students to remain in the system up to doctoral level; and supporting unemployed graduates in work experience in science, engineering and technology institutions. The second, as highlighted by the data presented in the preceding sections, is related to significant increases in doctoral enrolments and graduations – within the higher education system as a whole and, specifically with regard to internationalisation, in the enrolments and graduations among international students, and in particular among students from the rest of Africa.

A third factor is that, relatively speaking, South Africa is an inexpensive destination for PhD candidates from other African countries.[12] In the United Kingdom, the average tuition fees for a full-time research PhD in education or the social sciences at Bath University are USD 6 600 for UK and European Union residents and USD 21 450 for students from other countries. With living costs at around USD 18 000 per annum, the total comes to around USD 46 050. In the United States, at the University of California, Berkeley, the fee for non-residential students in the humanities and social sciences is USD 31 397, and in law and engineering USD 57 000. With living costs around USD 23 000, the total comes to USD 54 388. The first year of a PhD in education at New York University starts with tuition at USD 41 303, USD 3 500 for health costs and a USD 25 687 cost-of-living stipend, bringing the total to USD 70 490.

By contrast, from the perspective of PhD students from the rest of Africa, South Africa is a bargain. In the five universities (three of which are in the Shanghai top 500) that produce 61% of the graduates from the rest of Africa, the cost in terms of tuition (full-time in the social sciences) is on average USD 2 000, plus another USD 1 000 for foreign student fees, medical aid, etc. The cost of living is estimated to be around USD 10 000 per annum, bringing the total to around USD 13 000. The total cost at a top South African university for the first year of a PhD in the social sciences or education is (at USD 13 000) four times cheaper than at the prestigious, high-competition University of California, Berkeley; three-and-a-half

12 Thanks to Professors Rajani Naidoo (University of Bath), John Douglass (University of California, Berkeley) and Teboho Moja (New York University) for information on costs for doctoral study.

times cheaper than at Bath University; and five-and-a-half times cheaper than at a top private institution such as New York University.

Despite these positive contributing factors, arguably there is also a range of systemic, capacity, financial and attitudinal factors that (potentially) stand in the way of South Africa realising the aspiration of becoming a PhD hub for the continent.

South African immigration policy relating to foreign PhD students and academics

Despite the policy, planning and investment intentions of the South African government, highlighted in the introduction to this chapter, when it comes to the Department of Home Affairs and study and employment visas, the picture is much more complicated and ambiguous. For a study permit, the basic information is straightforward; the key requirement is an official letter from the educational institution where the student intends to study, confirming provisional acceptance and the duration of the course. According to the Department of Home Affairs website,[13] the overriding considerations in processing applications for study permits are that: no foreigner must displace a South African citizen/resident at a local educational institution; the student must have proof of sufficient funds to pay for day-to-day living expenses, accommodation and tuition fees during his/her stay in South Africa; and the student must have adequate medical cover with a registered South African medical scheme.

In response to a question about how difficult it is for candidates from Africa to obtain visas, a senior university administrator[14] reported that 'it is highly variable' but that that there is no firm evidence that African applicants have a harder time than others. She reported that a key factor which influences a successful outcome is the completeness of an application but that there are other mission-specific factors that can play a role. For example, the embassies in Nigeria, Ghana and Cameroon are very careful to make sure that the applicant is legitimate; they often request additional supporting documentation and will often verify information before issuing study visas. It thus seems that with regards to students, the variability is more individual embassy-based than a systemic ambiguity.

The ambiguity arises with regard to academics and to allowing graduates to remain in South Africa. The reality is that the imperative to produce 5 000 doctorates every year does not only depend on demand from students but also on the institutional capacity to supervise. If the growth in graduates in South Africa between 2008 and 2012 (12.3% on average per annum) is maintained, the target is reachable – but that assumes a similar growth in supervision capacity. For example, at current enrolment-graduation ratios, 5 000 graduates will require about 37 160 enrolments. With only 35% of South African academics (6 744 in

13 Department of Home Affairs website: http://www.home-affairs.gov.za/index.php/immigration-services/types-of-temporary-permits [accessed December 2014].

14 Personal communication, Dorothy Stevens, Deputy Director of the Postgraduate and International Office, University of Stellenbosch (2014).

2012) with a doctoral degree, this confronts the 'conundrum that in order to produce more doctoral graduates, more PhD supervisors are needed: but in order to have more supervisors, more PhDs are needed' (MacGregor 2013). This was echoed by the international office official, who commented from the perspective of academia:[15]

> *As we are all acutely aware, we do not have the supervisory capacity in South Africa to produce the number of PhDs the government has set as a target. I suspect that we also don't actually have the local candidature either. It thus seems logical that given our skills shortages and capacity challenges that where skilled workers wish to remain, they ought to be welcomed.*

One way to increase supervisory capacity is to employ suitably qualified academics from other African countries in South African universities. At a number of universities, such as Fort Hare and North West (Mafikeng campus), where substantial numbers of foreign academics have been employed, an unanticipated outcome has been a huge increase in publication output. At Fort Hare, the publication output trebled between 2008 and 2012. At Mafikeng (the previously historically disadvantaged campus), the publication output grew from 6% of North West University's output to 22% by 2012, and the ratio of publications per academic exceeded that of the historically white advantaged Potchefstroom (DHET 2013b). This 'transformation' has finally punctured the myth that conditions at the historically black universities are so detrimental that academics cannot do research and publish. A second unanticipated outcome is that the academics from the rest of Africa also attract doctoral students from the rest of Africa, so at Fort Hare for example, the output of PhDs quadrupled from 11 in 2008 to 43 in 2012 (ibid.).

The South African immigration policy relating to foreign academics and foreign skills has become ambiguous and uncoordinated. In June 2014, new guidelines for work permits were promulgated. The central change is that while previously a candidate could be accepted with what was described as 'exceptional skills', this has been replaced with a more focused and defined category of 'critical skills', which are deemed critical to the needs of the country's economy (Republic of South Africa 2014). For academic positions, academics and researchers are listed as a critical skill. However, at a workshop (May 2014) between the universities and the Department of Home Affairs, officials who had drafted the regulations disagreed with each other about whether academics and researchers should be read as 'and' or as 'or', the implication being that if it is academics *and* researchers, then academics would be required to fulfil the critical skills list. The published list contains 40 areas, of which more than 30 are in South Africa's new global research niche area of astronomy. The list starts with areas such as galaxy formation and deep observations of earlier galaxies, and ends with earth observation

15 Personal communication, Dorothy Stevens, Deputy Director of the Postgraduate and International Office, University of Stellenbosch (2014).

and natural and applied sciences (ibid.). One immediate implication would be an end to international appointments within the humanities, law or social sciences. At the time of writing this chapter, this issue remains unresolved.

A senior university official dealing with international students and staff observed that the list of bodies/authorities, from which confirmation and/or evidence of one's critical skills is required, is lengthy, and that officials are reluctant to help and are seemingly uncertain about what is expected of them. The consequence is that critical skills visas are often issued effortlessly outside of South Africa, whereas within South Africa there is uncertainty: 'The risk here is clear: the processes, (mis)interpretation and insufficient coordination between government departments is/will prevent us from retaining these critical skills.'[16]

Resistance to internationalisation (or the rest of Africa?)

In practice, it is the institutions and individual academics that drive the recruitment and training of students and, at the institutional level, the demand for more doctorates produces different and often conflicting discourses.[17]

For academics, students from the rest of Africa could be described as a 'golden triangle'. Firstly, by admitting these students, academics are responding to government and institutional leadership pressures to enrol more Africans (transformation). Secondly, more students from the rest of Africa apply and, according to completion rates (47% versus 45%), they complete their degrees slightly more quickly, and they appear to have more access to financial resources (efficiency). Thirdly, and based entirely on anecdotal reports (academic rumour), students from the rest of the continent have on average better writing skills (quality). What more can an institution and an academic want than substantial government funding plus the kudos for responding to transformation, efficiency and quality – the three discourses that are often regarded as being in tension, if not incompatible (Badat 2004).

However, what about the SA-Africans and the post-1994 policy emphasis on 'transformation' via demographic change? When it is pointed out, for example, that black female PhD enrolments have increased by 1 404% over the period 1996 to 2012, some observers raise the point that this does not amount to transformation since a significant proportion of these students are not SA-Africans. Implicit in this position are two seldom-expressed opinions. The first is that there is a reservoir of South Africans who are not selected because better-prepared candidates from other African countries are preferred.[18] A second view is that while academics are doing good work, they must do better to build a bigger pool of candidates; that is, recruit

16 Personal communication, Dorothy Stevens, Deputy Director of the Postgraduate and International Office, University of Stellenbosch (2014).

17 In a forthcoming book on the doctorate in South Africa (Cloete & Mouton), this problem is investigated through a qualitative study of 25 'PhD-productive' departments in the social sciences and humanities.

18 Those holding this opinion do not answer the question as to why South Africans, in the most advanced economy on the continent, are not as well prepared.

and train more SA-Africans. The question that those who hold this view seldom ask is why there are so few SA-Africans applying for doctoral studies. A somewhat obvious answer, without systematic empirical evidence, is 'financial barriers'. However, if producing more doctorates is a national policy priority, why are there not more resources allocated to SA-Africans who qualify to register for PhD degrees? It is perhaps not surprising that the country with one of the highest PhD success rates is Norway where doctoral candidates are employed as junior staff at a university for three years at a competitive salary (Cloete & Mouton forthcoming).

Another unintended consequence of the transformation imperative relates to black economic empowerment and talent. Globally, the PhD is seen as an indicator of talent. However, in South Africa, a bachelors degree (not to mention a masters degree) from a top-500 university in the world puts an SA-African on the talent radar of companies and the civil service, which are under considerable affirmative action labour legislation pressure to recruit 'black talent'. So, while South Africa could be seen as a very market-competitive destination for aspiring PhD candidates from other African countries, for the prospective SA-African doctoral candidate, it is by far not as lucrative.[19]

Finally, reference can be made to what could be termed 'middle-class xenophobia' where the new African middle class, with access to policy influence, is trying to reduce competition for lucrative professional positions and lifestyles. While the method is much more genteel, the impulse is no different from the township attacks and looting of foreigners' businesses. Could this be interpreted as government being willing to contemplate providing protection for middle-class positions but not for lower-skilled jobs and small businesses?

Brain drain or brain circulation?

In both South Africa and the rest of Africa, there might be a broad agreement emerging that there is a need for more PhDs, as was expressed by the Chairperson of the African Union Commission, Dr Nkosazana Dlamini-Zuma at the NRF/Carnegie Corporation meeting in 2013. However, at the same meeting, a vice-chancellor from a university in Nairobi complained bitterly that some of their brightest candidates were going to South Africa but then not returning – implying an intra-continental brain drain. Dr Zuma's response was that her main concern was that talent must not leave Africa and that the circulation of high-level skills in Africa was very important for strengthening the African Union.[20]

This interchange reflects a major global debate around the brain drain and so-called 'brain circulation' as encapsulated by Anna Lee Saxenian (2002: 1) as follows:

19 Objectively, the cards are stacked against a talented African woman choosing an arduous seven-year programme (only 45% complete in seven years) in which she will, in all likelihood, have to submit to the authority of an elder white male supervisor and will hardly have spare money for her mobile phone and other accessories.

20 A recent study by the Swedish International Development Cooperation Agency found that many of those who returned from doing their PhDs in Sweden did not find a welcoming climate or jobs back home (Felleson & Mählck 2013).

> *Understandably, the rapid growth of the foreign-born workforce has evoked intense debates over U.S. immigration policy, both here and in the developing world. In the United States, discussions of the immigration of scientists and engineers have focused primarily on the extent to which foreign-born professionals displace native workers. The view from sending countries, by contrast, has been that the emigration of highly skilled personnel to the United States represents a big economic loss, a 'brain drain'. Neither view is adequate in today's global economy. Far from simply replacing native workers, foreign-born engineers are starting new businesses and generating jobs and wealth at least as fast as their U.S. counterparts. And the dynamism of emerging regions in Asia and elsewhere now draws skilled immigrants homeward. Even when they choose not to return home, they are serving as middlemen linking businesses in the United States with those in distant regions … the old dynamic of 'brain drain' is giving way to one I call 'brain circulation'.*

Saxenian's studies were based mostly on Silicon Valley and its interaction with East Asia, and later with Latin America. For her, the Silicon Valley experience is but an example of far-reaching transformation of the relationship between immigration, trade, education and economic development in the 21st century. The new high-skill immigrant entrepreneurs foster economic development directly by creating new jobs and wealth, both in their new country and back home, and indirectly by coordinating information flows and providing linguistic and cultural know-how that promote trade and investment both ways (ibid.: 6). While Silicon Valley might be the innovation centre of brain circulation, and has brought immense wealth to California, issues have been raised about immigration policy in the United States and its impact on retaining high-skill immigrants in the country. As recently as 2010, New York Mayor Michael Bloomberg, joining influential chief executive officers from the Partnership for a New American Economy, said: 'I can't think of any ways to destroy this country quite as direct and impactful as our immigration policy … we educate the best and the brightest, and then we don't give them a green card' (Packer 2010).

Silicon Valley can be characterised as a space with a high concentration of postgraduate intellectual talent from across the globe (Saxenian 2002), together with a culture of innovation (Dormehl 2012) that is fed by significant government spending on basic research and enormous amounts of venture capital. Furthermore, in Silicon Valley there is a separation, but also a proximity link, between the role of the university in the production of knowledge and the role of industry (Mazzucato 2013). The dynamic that led to brain circulation, as opposed to brain drain, might be an extremely attractive narrative for Africa – a model that would 'save' Africa from poverty and catapult the continent into an innovative, entrepreneurial member of the global community.

But, Saxenian (2014: 29) also tells a different story where failure to invest in local infrastructure and public education, amongst others, leads to an unequal society:

> *The region (Silicon Valley) continues to attract world-class talent and incubate successful start-ups—with a handful in each generation growing into corporate giants like Apple and Google—at the same time as new centres of technology entrepreneurship have emerged around the US and in other parts of the world, from Finland and Israel to China and India. For some observers these economies pose a challenge to Silicon Valley's leadership. This chapter argues that the region's problems are closer to home: Silicon Valley is threatened less by foreign competition than by decades of neglect of the collective social and human development that underpins its economic success. As the region emerges from the current economic crisis, the failure to invest in the local infrastructure, aggressive cuts to funding of public education and other government services, and the rising cost of living contribute to an increasingly unequal society.*

It could be argued that Silicon Valley is not a model for Africa for a number of reasons, including that there is no significant public investment in basic research and little in the way of venture capital; that innovation is survival- rather than corporate giant-orientated; and that Africa is not an ecosystem that is a magnet for talent and, alas, Silicon Valley not a model for reducing inequality.

South Africa as a PhD hub with brain circulation

For the foreseeable future, South Africa and Africa should at least postpone the idea of Silicon Valleys, and rather focus on a more modest discourse, namely to develop 'EdHubs' (see Douglass et al. 2011, 2014). The EdHubs model enables the enrolment of more high-paying 'out-of-state' students, and creates a space where universities can imagine themselves as knowledge hubs that respond to both regional and national economic needs, as well as to the thirst of a growing world (African) population for high-quality tertiary education (ibid.). Such a discourse could sit quite comfortably with the *White Paper for Post-school Education and Training,* which states that hosting large numbers of international students could represent a major contribution by South Africa to the development of the sub-continent (DHET 2013a: 40). The *White Paper* also states that all the countries in the SADC region are interdependent and that the strengthening of Southern African economies will inevitably result in the improvement of South Africa's own economy. And the *NDP 2030* actually suggests that South Africa could establish itself as a hub for higher education and training in the region.

But this raises the differentiation question: All levels of students for all universities? From the data and arguments presented in this chapter, a case emerges for the South African DST Ten-Year Innovation Plan which proposed that: 'to build a knowledge-based economy positioned between developed and developing countries, South Africa will need to increase its PhD production rate by a factor of about five over the next 10–20 years' (DST 2008: 29). This dovetails quite well with the *NDP 2030* argument that South Africa needs to increase the

number of academics with PhDs, which would improve the quality of student outcomes, as well as significantly contribute to the capacity to supervise higher degrees and, ultimately, to the research productivity of the sector.

If South Africa is to focus its internationalisation efforts on postgraduate (and specifically doctoral) education, rather than on undergraduate education, postgraduate education should become more closely linked to an innovation, brain circulation economy/migration model. As the University of Stellenbosch experience with the PANGeA project (described earlier in this chapter) shows, it is very challenging to fully develop research and academic circulation between the particpating universities. Stellenbosch is one of the few so-called 'innovation districts'[21] in South Africa, but stimulating interaction between doctoral education and the innovation district seems, for now, to remain on the level of intention rather than practice.

In a study on Swedish development support for research capacity-building in Mozambique (Fellesson & Mählck 2013), the main results indicate a remarkably low mobility among the PhD graduates, geographically and sectorally. Furthermore, the attainment of a PhD degree was highly valued among many of the graduates, particularly in terms of boosting status and self-confidence, and fast-tracking their careers in either academic departments or the university administration. This indicates that support for PhD training has resulted in the building of a foundation for research at the Eduardo Mondlane University in terms of qualified individuals. However, the survey also highlighted considerable dissatisfaction amongst the participants – especially with regard to a lack of resources, working conditions and the degree of independence they were afforded. Many reported performing the same duties after graduation as they had before entering the programme, and while the majority of the graduates continued to do research, this was on a very small scale. Supplementary income from consultancies seems to be widespread among graduates, and is an accepted part of academic life at the University (ibid.: 5–6). A finding on the experience of training that should be worrisome for South Africa is (ibid. 6):

> *the significantly higher level of dissatisfaction among graduates and candidates that have done or were doing their training at South African universities, compared to their Swedish equivalents. Access to supervisors and quality of supervision is the dominant practical problem facing PhD students, and this is constant over more than decade.*

Brain circulation could only be achieved if conditions at the rest of Africa's flagship institutions provide environments – and particularly research environments – that stimulate continental collaboration.

The emergence of Silicon Valley was not the result of a government policy, hatched in a smoky Washington office with lobbyists. Rather, it was the outcome of a confluence of factors,

21 See http://www.wdccapetown2014.com/projects/project/487.

such as the United States Department of Defence switching significant amounts of research money to electronics within, arguably, the 'best' higher education system in the world (i.e. the California differentiated system); the availability of large amounts of floating venture capital; and a counter-culture of openness ('anything goes').

From the data presented above, it could be argued that there is also a confluence of factors that make South Africa a possible PhD hub for Africa (although, as the statistics show, not for the rest of the world); in particular, national policies that stimulate doctoral education, the 'golden triangle' for certain universities, and market forces (competitive pricing). However, this is not government policy. Currently, with the exception of a few politically correct references to the rest of Africa, the official policies are nationalistic in that they focus on how to improve South African higher education and how to make South Africa a knowledge economy. The South African government thus faces an interesting conundrum. Do they try to stimulate a hub, knowing that it cannot be done without students and staff from the rest of Africa, or do they restrict the intake of foreign doctoral candidates and academics in South African universities and provide additional stimulus for South African candidates? Or do they not intervene and simply monitor how this develops over the next few years? Either way, there will need to be an agreed-upon and coordinated approach by the relevant government departments (i.e. DHET, DST and Home Affairs) rather than the counterproductive pursuance of contradictory polices.

In addition to coordinated political will, more monitoring would need to include the tracking of student mobility: in other words, who goes back to where, who stays, and where (in which sectors and positions) do they get employed? All in all this points to a more rational, research-informed and consultative approach amongst all collaborators if South Africa is to be a PhD hub with brain circulation, and not just another version of internal continental brain drain with inevitable xhenophobia and accusatory transformation discourses.

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Appendix tables

Table A5.1 The 59 countries of origin of the 2012 international PhD graduates

Country	2012	Accumulative %
Zimbabwe	142	22.5%
Nigeria	76	34.6%
Kenya	43	41.4%
Uganda	29	46.0%
Ethiopia	23	49.7%
United States	23	53.3%
Cameroon	19	56.3%
Ghana	19	59.4%
Tanzania	18	62.2%
Zambia	17	64.9%
Democratic Republic of Congo	15	67.3%
Lesotho	15	69.7%
Malawi	15	72.1%
Sudan	15	74.4%
India	13	76.5%
Mozambique	13	78.6%
Namibia	13	80.6%
Germany	11	82.4%
Botswana	10	84.0%
Rwanda	10	85.6%
United Kingdom	9	87.0%
Swaziland	7	88.1%
China	6	89.0%
Iran	6	90.0%
Canada	5	90.8%
Eritrea	5	91.6%
Mauritius	5	92.4%
Gabon	4	93.0%
France	3	93.5%
Netherlands	3	94.0%
Russian Federation	3	94.4%
Switzerland	3	94.9%
Belgium	2	95.2%
Italy	2	95.6%
Libyan Arab Jamahiriya	2	95.9%
Madagascar	2	96.2%
Sierra Leone	2	96.5%
Angola	1	96.7%
Benin	1	96.8%
Bosnia and Herzegovina	1	97.0%
Brazil	1	97.0%
Burundi	1	97.3%
Chile	1	97.5%
Egypt	1	97.6%
Greece	1	97.8%
Ireland	1	97.9%
Israel	1	97.9%
Liberia	1	98.3%
Malaysia	1	98.4%
Morocco	1	98.6%
New Zealand	1	98.7%
Norway	1	98.9%
Palestine	1	99.0%
Republic of Korea	1	99.2%
Senegal	1	99.4%
Singapore	1	99.5%
Spain	1	99.7%
Sweden	1	99.8%
Taiwan	1	100.0%
Total international	630	

Compiled by Charles Sheppard
Source: DHET (2013b)

Table A5.2 PhD graduates of 2012 according to nationality and gender as a percentage of the total (1 879) graduates

Race	Nationality	Females	Males	Total
African	International	7.2%	20.7%	27.9%
	National	5.5%	10.2%	15.8%
	Total	12.8%	30.9%	43.7%
Coloured	International	0.2%	0.7%	0.9%
	National	1.8%	2.7%	4.4%
	Total	1.9%	3.4%	5.3%
Indian	International	0.3%	1.5%	1.9%
	National	3.4%	2.3%	5.7%
	Total	3.7%	3.8%	7.6%
White	International	1.5%	3.2%	4.7%
	National	22.4%	16.3%	38.7%
	Total	23.9%	19.5%	43.4%
GRAND TOTAL		**42.3%**	**57.7%**	**100.0%**

Compiled by Charles Sheppard

CHAPTER 6

FACULTY PERCEPTIONS OF THE FACTORS THAT INFLUENCE RESEARCH PRODUCTIVITY AT MAKERERE UNIVERSITY

Gordon Musiige and Peter Maassen

Introduction

Many studies have been undertaken to examine the link between knowledge production, innovation and economic growth in the western world (Crompton 2002; Mokyr 2003). In addition, knowledge transfer through education is seen as a key determinant in innovation and in strengthening social welfare (Bindé & Matsuura 2005: 27) and reducing social inequality. This explains why the university is increasingly perceived not only as a source of intellectual progress, but also as a transversal problem-solver; that is, a 'magic box' that can produce solutions to the problems that challenge the world (Bloom et al. 2006). Whether it is true that universities can produce relevant solutions or not, the university's traditional position as the prime knowledge institution in society makes it an obvious candidate to provide societal solutions to today's grand challenges. The notion of a (global) knowledge economy compels us to look more closely at the assumptions with respect to knowledge production as a key driver for innovation and technology. It is important to learn from countries such as the United States, which has successfully built its academic research capacity within and outside the university, yielding many positive results, including a more innovative industrial sector and better technical skills in the workforce than any other nation in the world (Mazzucato 2013: 52).

Castells (2001) highlights the generation of new knowledge as one of the key functions of the university, alongside the formation and diffusion of ideology, the selection of a dominant elite, and the training of a skilled labour force. While there has been a long – and in many respects effective – interplay among the above functions in other parts of the world, especially Europe and North America, this has not been the case in Africa. Here, universities are historically rooted in a colonial past (ibid.: 212), implying that their main functions have consisted of ideology

formation (political agents for newly independent states) and the selection of dominant elites to fill the leadership vacuum following independence. Only more recently has the function of training the labour force for the public service emerged in a substantial way. The function of generating new knowledge has hardly developed, and where it has, it has been reserved for some senior academics in a few selected university faculties. As a consequence, the academic research intensity and productivity in sub-Saharan African universities lags considerably behind university academic research output in the rest of the world.

The importance of the potential contribution of academic research to African societies cannot be overstated. Research into themes such as health care, nutrition, sustainable energy, environmental protection, agricultural mechanisation, education, and industrial production can provide a much-needed knowledge foundation for social development, innovation and economic growth. This gives the university in Africa a unique position as the core knowledge institution. It is in this light that governments, donor agencies and private actors collaborate with universities to build stronger research capacity and productivity. Nonetheless, nearly all sub-Saharan African universities are struggling to improve their academic research productivity.

It is against this backdrop that in the study underlying this chapter, the factors that influence research productivity at Makerere University (MAK) in Uganda were explored. This study is a masters degree thesis project and an extension of the work done as part of the Higher Education Research and Advocacy Network in Africa (HERANA) project, which revealed that MAK's research output was negatively influenced by the limited number of academics with PhD degrees, as well as low PhD graduation rates and a poor incentive structure that did not stimulate scholarly publishing (Cloete et al. 2011).

Makerere University: A historical background

As is the case with other African flagship universities, MAK is a colonial legacy. It was established as a technical school in 1922 for the training of Ugandans in artisan roles such as carpentry, building, metal fabrication and mechanics. According to Musisi and Muwanga (2003: 7), in establishing the school, the British colonial government wanted to show the rest of the world that it cared about the educational needs of its colony. Two years after its establishment, the curriculum was expanded to offer vocational courses in nursing, teacher education, veterinary sciences, primary teaching and agriculture, the graduates of which had to satisfy the labour needs of the colonial and Buganda government. Sicherman (2008: 13) states that the implicit purpose of this was to create a 'controlling education' to forestall the dangers of an independence movement. By 1937, the institution had been elevated to the Higher College of East Africa, whose students came from as far afield as Zambia, Kenya and Tanzania.

After the Second World War, MAK became a university college with degrees awarded by the University of London. With the establishment of the regional University of East

Africa (Kenya, Tanzania and Uganda) in 1963, the special relationship with the University of London came to an end and the new institution could award its own degrees. On 1 July 1970, MAK became an independent national university of the Republic of Uganda, offering degree programmes at undergraduate and postgraduate levels. By that time, Uganda's neighbouring countries had attained their independence and needed to establish and invest in their own universities, which resulted in the closure of the joint regional university and the establishment of the University of Nairobi (Kenya) and the University of Dar es Salaam (Tanzania), alongside MAK.

Throughout the 1970s, Uganda experienced political turmoil that saw the then-famous university slide into academic gloom as a result of the ravaged infrastructure, and because talented academics were fleeing to Europe and North America. It was not until the early 1980s that MAK started to recover from the effects of the political instability and the university embarked on reforms to promote economic stability and liberalisation (Magara 2009: 70). These reforms came in the form of conditionalities from the World Bank: structural adjustment policies across Africa advocated a reduction in public spending on higher education and a shift of public funds to primary education. Mamdani (2007: 8) argues that these policies were deliberate decisions to devalue higher education as an object of public policy. For MAK, this translated into cost-sharing in the sense that the government reduced student allowances provided by the state and stimulated the enrolment of self-sponsored students. The mass entry of self-sponsored students took its toll not only on the infrastructure of the university, but also on the research activities of academic staff: with the increase in the teaching load, research became a distant endeavour for many MAK academics.

Research focus and analytical framework for the study

Research focus and key questions

As referred to in the introduction to this chapter, research has traditionally not been a core function in the practice of African universities (Castells 2001). However, in the global context of the knowledge society, a debate has emerged in many African countries, including Uganda, on each country's research capacity, infrastructure and output, and attempts have been made to strengthen the research function of at least the national flagship universities. In this an issue has been that most academic staff members of African universities have not been very research-active, which has impacted the gross research output levels. In the underlying study we seek to understand factors influencing university research productivity by focusing on the perceptions and experiences of individual academic staff members at one of the most prominent African research universities, that is, MAK.

The overall research problem explored in the study has been formulated as follows: What

are the main factors influencing research productivity at MAK? Based on the overall research problem, this study has addressed the following research questions:

1. What is meant by 'research productivity'?
2. How has research productivity developed over the last ten years at MAK?
3. How is research leadership and management organised at MAK, and what is the institution doing to stimulate research?
4. What are the main sources of funding for research at MAK?
5. How do the factors at the individual level influence research productivity at MAK?
6. How has the research culture influenced research productivity at MAK?

Operationalising 'research productivity'

Across the globe, higher education has witnessed significant reforms with respect to the way in which universities and colleges are governed, funded and organised. In Europe, 'new public management' has been argued to have had a far-reaching effect on higher education in this regard (Amaral et al. 2003), whereas in the United States, universities have become more market-driven (Geiger 2004). In both cases, the underlying ideologies advocate for greater competition among universities, professional management, output-funding and cost-sharing (Gornitzka & Maassen 2014). As such, research productivity is used as a performance indicator for university faculty in the United States and Europe. In addition, the number of scholarly publications of an institution is taken to be a key determinant of its position in global rankings and of its hiring practices and research funding.

The interpretations of what constitutes research productivity and how it can be measured varies between authors and universities. Perhaps the most widely-used definition is that provided by Cresswell (1985: 24), who describes research productivity as comprising research publications in scientific journals, academic books and conference proceedings; gathering and analysing original evidence; obtaining competitive research grants; carrying out editorial duties; obtaining patents and licenses; and producing monographs and papers presented at professional meetings. While some universities measure research productivity in terms of a wide array of outputs (such as text books, book chapters, research reports, conference proceedings and graduate student supervision), Hardré et al. (2011: 20) note that peer-reviewed articles are the most generalisable measure of research productivity across all academic fields.

For the purposes of this study, given that MAK was one of the universities included in the HERANA project, the investigation of research productivity at MAK incorporates the three major components that Cloete et al. (2011) focused on: namely, the publication of scholarly articles, conference proceedings, and the supervision of PhD students. While many studies that have examined research productivity in Africa have used an evaluative approach with an emphasis on bibliometrics (see, for example, Arencibia-Jorge et al. 2012; Boshoff 2009; Tijssen

2007 in Mouton 2008), this study, like the HERANA project, used an exploratory approach to study research performance (see Avital & Collopy 2001).

Analytical framework: Factors that impact on research productivity

In order to analyse research productivity at MAK, we have identified and drawn upon four major categories of factors that can be argued to affect research productivity. These factors include individual factors, organisational factors, funding and research culture and these are outlined in brief below.

Individual factors

The individual's role with respect to the research function cannot be overstated in the university setting. Various individual attributes have been found to be instrumental in stimulating the research behaviour of academics. A number of these, including a passion for or interest in the discipline, ambitions, self-esteem, age, career rank, academic qualifications, and a desire to collaborate with others, are related to academics' level of intrinsic motivation. Lechuga and Lechuga (2012) sum these up as 'self-determination' (i.e. autonomy, competence and relatedness) and Hardré et al. (2011) as 'self-efficacy' and 'self-determination'. Another motivation-related characteristic is the confidence of the academic to engage in research activities, which Kotrlik et al. (2002) found to be essential for research productivity. Other studies have dealt with different individual attributes, which have also been found to vary according to academic disciplines (hard or soft); for instance, Jung (2012) states that gender, years of experience, teaching time versus research time, level of multidisciplinary collaboration, research style and workload are of relevance.

In the context of MAK, the most quantifiable individual factor was the level of academic staff qualifications as an indicator for research output. By 2011, only 43% of the academic staff at MAK held PhD degrees. This implies that the remaining 57% represent a problem in the form of a research capability gap (Bunting et al. 2014: 18).

Organisational factors

The research function does not occur in an organisational vacuum. Historically, the university has brought together individual academics with different intellectual interests and ambitions. Clark (1998: 3) refers to the traditional department as the 'academic heartland' around which university disciplines and fields are built, and Cloete et al. (2011) refer to the 'academic core' of the university where knowledge is produced and academic degree programmes are offered. As a consequence, for examining research productivity it is of importance to include the organisational context of research activities undertaken within a university as one of the major factors.

A number of studies have argued that organisational factors have an important influence on research productivity (see, for example, Fairweather 1999; McGill & Settle 2012). Azad

and Seyyed (2007), for instance, list a vast number of organisational factors vital for research productivity, including the clarity of the institution's research expectations; the availability of student research assistance; financial incentives for conducting research; and access to internal and external research funds, to name but a few. Different institutional components ranging from financial incentives (allowances, salaries), to non-financial incentives (improved research management, modern infrastructure, promotions) have been employed by different universities to stimulate the research productivity of their academic staff members (Ubogu & Van den Heever 2014: 212). In the African context in particular, studies have examined the weak research management structure and the prevalence of a consultancy culture as impediments to research capacity in African universities (see, for example, Maassen 2012; Sawyerr 2004). In the HERANA study, Cloete et al. (2011) identified three major hindrances to research productivity at MAK, including the lack of funds and a proper incentive system; the absence of PhD mentorship programmes and incentives; and the competition for time between undertaking research and teaching in private universities.

Drawing from the organisational factors highlighted above, this study focused on institutional incentives for research (financial and non-financial); the availability of doctoral mentorship programmes; the level of institutional clarity on research; the use of refereed journals in research dissemination; and research leadership and management.

Funding

Universities require a financial basis to support their day-to-day activities. These range from remunerations of their staff and infrastructural development to direct research funding. The research function requires adequate funding for, amongst others, the extension of departmental libraries; stocking laboratories with equipment; subscriptions to major journals; salaries and staff allowances; funding for travel; and facilitation of seminars and workshops. With higher education becoming more competitive, universities require more capital investments to be able to compete successfully with other research universities. However, across the globe, the massification of higher education has forced governments to limit their investments in higher education. As a consequence, universities have had to diversify their income using private means in order to support their academic functions.

For universities in sub-Saharan Africa, the relative massification of the last decade has created a dilemma: whether to invest more in the academic function of teaching to maximise income through self-sponsored students, or to invest in knowledge production. In this regard, a Thomson Reuters report revealed a correlation between the level of gross domestic product (GDP) investment into research and the level of research output in Africa; in particular, countries with a higher GDP had a higher research output compared to countries with a lower GDP (Jonathan et al. 2010: 5). Over the period 2008–2012, many developed countries invested between 3–4% of their GDP in research and development (R&D) activities (European Commission 2014). By comparison, developing countries invest in general less than 1% of their GDP in R&D (Sanyal & Varghese 2006; UNESCO 2010). It could be argued that this low investment in research

is reflected in Africa's research output. According to a recent Scopus report (Huggett 2013), between 1996 and 2006, Africa's scientific research output increased from about 12 500 to over 52 000 academic articles, a limited increase from 1.2% to 2.3% share of the global production of academic articles (Schemm 2013: 11). In the case of Uganda, the level of investment in research is still wanting; in 2003 Uganda invested 0.74% of its GDP in R&D (Sanyal & Varghese 2006: 3). This percentage has decreased since 2003 to below 0.5%.[1]

In the context of MAK, Cloete et al. (2011: 158) observed that the University had insufficient funds to build its research capacity as a result of the relative decrease in public funding of higher education over the last 20 years. Currently, MAK's research funding relies mainly on private donors and foreign development agencies; but, as Maassen (2012) has shown in his study of donor funding in sub-Saharan Africa, donor funding is an unsustainable means of funding research for a flagship university. In particular, Maassen points to the 'fragmentation' that results from donor-funded projects within universities and highlights that donor research priorities might not be in line with those of the institution and the country (ibid.: 248). Consequently, academics become more 'reporters to donors' than producers of research-based academic publications, since very few donor projects require scholarly output. In short, academics benefit financially from donor projects, and the lack of incentives to engage in scholarly research and produce academic outputs are amongst the factors responsible for the low research productivity at MAK.

Research culture

Research productivity is highly dependent on the belief and general orientation of faculty to advance in their discipline. Clark (1983: 72–73) stresses that in order to understand the productivity of universities, it is important not only to focus on the organisational structure, but also to include the organisational culture – that is, the non-rational or symbolic side of universities – as an important factor.

For the purposes of this study, research culture is assumed to be a sub-culture of the broader organisational culture (Maassen 1996). What then does research culture comprise? Hill (1999: 2) uses key terms to refer to research culture, such as observed behaviour regularities (the language and rituals, research group norms and research leadership focus); the philosophy guiding the organisation's research policies; and the climate or feeling that the organisation conveys on research. This is also recognisable in Salazar-Clemeña and Almonte-Alcosta's (2007: 4) understanding of research culture, which includes institutional research policies and agenda, departmental culture, budget for research, as well as policies and guidelines with respect to research benefits and incentives.

Although MAK's strategic plan emphasises the role of research and innovation, the evidence suggests that the institution has not transformed from being in essence a teaching university to a more research-orientated university (Makerere University 2008: 8). For instance, between

1 See http://www.uis.unesco.org/FactSheets/Documents/sti-rd-investment-en.pdf.

1996 and 2006, the number of academic courses at MAK increased from 26 to 40 as a result of a policy that sought to create more 'market-driven', relevant and self-sustaining courses (Mamdani 2007: 35). On the other hand, by 2011, only 43% of MAK's academic staff had a PhD qualification (Bunting et al. 2014). In the HERANA project, Cloete et al. (2011: 156, 158) indicated that although there was an increase in publication outputs from 73 in 2001 to 233 in 2007, the ratio of academic publications per staff was 0.20 which was, for example, far below the 0.50 target for South Africa's research universities (MAK's competitors).

Research design

The underlying study forms part of a master's dissertation project focusing on the factors that influence research productivity at African universities. The study used MAK as its case university, since it is Uganda's largest higher education institution and 'flagship' university, and produces about two thirds of Uganda's academic research publications. Two MAK colleges were selected for the study: the College of Agricultural and Environment Science, and the College of Education and External Studies. This was for comparative and validity reasons: the study wanted to get a balanced view on research productivity from the perspective of both the social sciences and the natural sciences. This is based on the starting point that disciplinary differences have an important impact on research productivity (Becher 1989; Jung 2012).

Semi-structured interviews were conducted among academic staff from both colleges who had a PhD degree, as well as with their heads of department and with university research administration staff. Mainly open-ended questions were used in the interviews since these offer the freedom to respondents to answer on their own terms (Bryman 2012). An in-depth and critical data analysis was done through a three-phase coding process: that is, open-coding, axial coding and selective coding (Neuman 2000). The data was collected at MAK's main campus in March 2014. Overall nine interviews were conducted: six with academic staff (three from each college involved), and three with administrators (namely, two heads of department in the two colleges involved and the research administrator of MAK).

Results and discussion

As mentioned earlier, this study sought to explore the different factors that influence research productivity at MAK through the experiences and perceptions of its academic staff. The findings of the study are presented according to the major components of the analytical framework, namely, individual factors, organisation factors, funding and research culture.

Individual factors

The findings indicate that the research function at MAK is both a varied and highly individualised exercise. MAK possesses both highly active and inactive academics in terms of research. Interviews conducted in the Agriculture and Environmental Science College, which is one of the MAK colleges with many donor-funded projects, attest to the notion of the role of individual determination and passion to engage in research. Of the academics who were interviewed, some expressed their interest in engaging in research projects with their students, while others explicitly indicated that their passion lay in teaching rather than research. This implies that even with access to research grants in the College, an academic's personal interest in and determination to engage in scholarly research is vital for the development of any research activities at MAK. Related to this, the findings also revealed that research-active academics were motivated by the desire to achieve a promotion or a financial reward. The need to achieve a specific goal is a vital driver for any academic; this can include undertaking research in order to broaden one's knowledge horizon or to ascend the career ladder. Strikingly, at MAK this individual research motivation factor has only weakly been translated into a collective research dimension.

The level of the academic qualifications of staff is a key determinant of the strength of the research capacity at a university. In particular, the doctoral level is the widely expected level for one to attain key skills of inquiry and other techniques required for research practice. In the context of MAK, the number of academic staff with PhD degrees was low in relation to the aspiration to sustain the research role in the university (Bunting et al. 2014). In part, the problem of the lack of the necessary academic qualifications needed for research can be understood as resulting from an institutional environment that places more emphasis on undergraduate teaching activities, than on building a core postgraduate or research environment.

Networking and collaboration with fellow researchers is a key ingredient of an active academic in the research function (Salazar-Clemeña & Almonte-Alcosta 2007). The progress and dynamics of the research function are always changing depending on, for example, the discipline, institution and country (Clark 1983). The findings of this study reveal that the few academics who publish actively at MAK have succeeded in creating networks with academics, especially those outside of the University. This is due to a number of factors, one of which is the 'uniting-factor': that is, having one or more externally funded projects. Academics reported that it was vital to create networks, especially with colleagues from other universities outside of the country, since this kind of research is generally funded by national and multinational agencies that require such networks as one of the conditions for funding. The other factor that led to academics networking with those abroad was the fact that they had obtained their postgraduate degrees from universities abroad. There are greater chances for an academic whose masters or doctoral degree has been obtained in Europe or North America to create academic networks in those countries, than for one whose education was obtained at MAK. It is also vital to note that the most 'networked' academics were in senior positions and many of them had the support of external sponsors (e.g. for attending seminars and conferences abroad).

Some academics pointed to the lack of institutional incentives to fund travel costs for seminars or conferences abroad, which limited their opportunities for international networking. One key aspect was raised by an academic respondent with respect to the nature of these networks and collaboration. In particular, the interviewee highlighted that most of these networks were akin to a contractual arrangement, which expired as soon as the parties involved had published and made a financial gain out of the project. In these cases, the network engagements had not been consistent and long-lasting.

Finally, the collaboration and networking of individuals across the departments was also a key issue that was hindered by the absence of key research group structures in the departments. This resulted in individual staff taking on personal research enterprises unless there was a donor-funded project to encourage him/her to liaise with colleagues in the department.

Organisational factors

Organisational factors particular to the research environments in most developing countries are not foreign to the MAK context. Castells (2001: 215) prefers to call organisational factors 'structural' and 'institutional' factors. In this, Castells highlights bottlenecks, such as the cumulative character of the process of uneven scientific developments; the unattractive environments in centres of excellence; low salaries and working conditions; and the limited resources dedicated to the university research function in developing countries. For the purpose of this study, the key indicators for organisational factors that have been utilised include institutional research policies; institutional support (both financial and non-financial) for research (including research infrastructure such as libraries, laboratories, and information and communication technology services); key journal subscriptions; adequate time available for research; and mentorship of PhD students.

When the MAK academics were asked if they were satisfied with *the level of institutional support* for research, their responses were varied. While most of them agreed that the time accorded to the research function was sufficient, since they only had to teach for a minimum of ten hours per week, they had reservations about the quality of the institutional infrastructure. In particular, all of them noted that their work as researchers was hindered by intermittent power cuts and slow internet connections. On the other hand, it has to be noted that the university has made key strides when it comes to library journal subscriptions, which academics reported had improved considerably over the last five years. The academics interviewed were also dissatisfied with the level of bureaucracy entailed in the procurement process in research projects; in particular, some projects were either behind schedule or had been interrupted by the university's procurement office, which was reported to be bureaucratic and unscrupulous. Overall the university's research support structures were regarded as insufficient and highly ineffective. Among other things, the failure to coordinate the support activities of various central administrative offices resulted in an environment that was not conducive to research work.

Another key issue had to do with *the level of clarity of institutional research policies*. Although the university's strategic plan clearly highlights that MAK is positioning itself as a research university, with the objectives of creating a supportive research environment and strengthening research capacity (Makerere University 2008: 8), this was not reflected in the reality of the academics' work environment. Research at MAK is managed under a central body, the Directorate of Research and Graduate Training, which was founded in 2010. This body oversees the graduate programmes in the university; gives publicity to research grant calls; negotiates with donor agencies; and is responsible for other research-related issues. Although this body had created a research policy and agenda for managing research at MAK, it had not decentralised its mandate to the departmental level. This had left the heads of department without any active authority when it came to research in their units. Furthermore, when heads of department were asked about their role regarding the research function, they revealed that their job was more of 'morale-boosters'; they had no mandate to oblige or even stimulate academic staff members in their departments to engage in research activities.

There were contradictions with regard to the university's objectives of moving towards becoming a research university and the policies relating to promotion among academics. For instance, the academics reported that at the time of recruitment, they were not informed that research was more important for their career progress than teaching. In addition, according to their appointment letters, the indicated prime role of the academic was that of lecturer (i.e. teaching). This explains why many academics immersed themselves in teaching during the primary years of their tenure rather than engaging in research. Moreover, the university had not instituted any research policy attached to job retention; rather, retaining an academic post depended on academics holding a PhD degree and attending to their teaching duties. In essence, the desire to obtain a promotion was the sole stimulant offered by the institution for the research function.

Mentorship and guidance of doctoral students is another organisational component attached to research at MAK. The role of doctoral students in supporting academics to publish and execute different projects cannot be overstated in research universities. However, in the context of MAK, various organisational challenges have contributed to the low PhD graduation rates. The study found that postgraduate studies were plagued by the failure of many doctoral students to fund their studies and to complete on time, and by the absence of mentorship programmes. The research administrators pointed out three major problems in relation to doctoral education at MAK: lack of institutional support, limited funding options, and supervision-related problems.

With regard to funding, at the time of the study, the university did not have an open funding scheme for doctoral students, apart from its staff who wished to pursue doctoral studies. It emerged that there were disciplinary variations with regarding to funding opportunities and completion times. In those colleges where PhD students had received scholarships (especially in the science disciplines), the students had not only been involved

within major projects, but had also completed their PhDs on time. On the other hand, in the humanities and social sciences, where there have been fewer scholarships, most students had to pay for their tuition fees out of their salaries. This implies that they had to divide their time between their studies and their paying jobs, which seriously prolonged the duration of their studies.

In terms of supervision, there were reports that the quality of supervision was affected by feedback delays and inconsistent follow-up. Furthermore, the problems related to supervision resulted from the lack of incentives towards supervision. On a positive note, the university had recently succeeded in enforcing two positive interventions regarding research capacity: firstly, requiring senior, tenured academics to supervise at least two PhD students as part of their academic duties and, secondly, requiring PhD students to publish at least three articles in reputable journals to qualify for graduation. At the time of writing, it was too early to comment on the effectiveness of these measures.

The use of refereed journals (internal and external) in research dissemination is a key determinant of an academic's career progress as far as research is concerned, since publishing in journals renders individual academics visible nationally or internationally. To a large extent, this determines networking opportunities and the impact one can make in one's field/discipline. In many sub-Saharan African universities, academics have faced a number of challenges when it comes to publishing in international academic journals, such as high subscription rates and limited circulation in Africa (Gray 2009: 10). In addition, Gray (ibid.: 7) points to the quandary that many African researchers are pursuing international journals as a single measure of performance, while neglecting alternative means of disseminating their research work. One of the consequences is that journals that are produced within African universities have suffered natural deaths after the completion of donor-funded projects, or have been inactive for long periods of time. In the MAK context, internal journals have lost their vibrancy owing to a lack of funding and to poor peer-review processes. As a result, most of the research-active academics have preferred to publish in international journals for fear that their works would be rejected by the university appointments committee when seeking promotions.

Another concern is that in the long run, some academics might lose interest in doing research since many of their works are rejected by highly competitive international journals and they have resorted to using internal journals, which are still struggling to survive. Some academics highlighted that most of the vibrant internal journals are funded under donor projects but that there is always a question of sustainability, especially after the project when most journals cease to exist. MAK's research structure plan does not include a scheme through which it funds its academics to publish in local journals as a way to boost their popularity and credibility among its staff. It can be argued that MAK has a role to play in strengthening the guidelines and procedures under which internal journals run, which should be consistent with the internationally accepted guidelines and procedures for academic journals.

Funding

Although funding can be considered to be a component of an organisation and thus an organisational factor, this study categorised funding as a separate factor owing to the specific role it plays in sub-Saharan Africa. As noted by Sanyal and Varghese (2006: 2), there is a high correlation between a country's level of investment in research and development and its scientific production. As discussed above, for all sub-Saharan African countries, the level of research funding is still considerably below the level invested in the OECD countries and is mainly provided by foreign donors (Maassen 2012).

Findings of this study reveal that MAK cannot adequately fund its research function. This is in line with Cloete et al. (2011: 158), who further add that the Ugandan Ministry of Education's funding towards research in universities was inconsistent and unpredictable. Interviews with MAK academics revealed that there were no direct funding or financial incentives towards research activities. According to the university administrators, the university occasionally offered internal grants for research activities but MAK's academic staff were reluctant to apply for these since the application process had not been clearly stipulated. The university's resources earmarked for research had been channelled towards funding its academic staff's doctoral studies which in itself is an effort towards building research capacity.

With inadequate income for direct research funding, the academics have relied mainly on donor funding to support their research projects through organisations such as the Swedish International Development Cooperation Agency, the Norwegian Agency for Development Cooperation, the United States Agency for International Development, and the Carnegie Corporation of New York (Makerere University 2013: 73). However, despite the key role played by foreign donors in building a research-active environment at MAK, donors usually have their own thematic priorities, which are often different from those of individual academics. In essence, the donors have determined the landscape of what research should look like at MAK. The downside of this is the ever-changing thematic interests and priorities of donor agencies that differ from institutional and national priorities. A number of the academics reported that on many occasions, they had found themselves leaning towards donor research interests, such as climate change, resilience and productivity enhancement. While each of these topics is of great importance in the national context of MAK, the emphasis put on them hindered the growth of individual academics since they had no funding or capacity to specialise in their own research pathways. Another challenge that was encountered regarding donor-funding was its distribution across different disciplines. In particular, donor funding at MAK has concentrated largely in science-orientated areas such as HIV/Aids, malaria, water, and information and communication technologies (ibid.: 72). This has left academics in the humanities and social sciences with less or no research support.

The dependence on donor funding for research places MAK in a precarious position since donor support depends largely on the health of diplomatic relationships between different

countries. In this regard, some academics raised the issue of the potential of their funding proposals being rejected by donor agencies on the grounds of Uganda's recent stance on homosexuality; in particular, some key development partners had either withdrawn or cut the amount of aid that they had been giving to Uganda in the area of higher education, most of which had been for research capacity-building.[2] Relatedly, although MAK's Directorate of Research and Graduate Training carries out a number of staff training programmes in the area of research grant proposal-writing, to enable faculty members to write better and more competitive proposals, there was still a belief that external grants were too competitive, which discouraged some staff from pursuing them. All in all there is a need for the university to devise means of diversifying income to fund research, with or without external support.

Finally, the HERANA project provided an important insight into the specific nature of research funding at MAK (Cloete et al. 2011). While the total amount of research funding for MAK is more or less at the same level as research funding at the continent's prime research university, the University of Cape Town (UCT),[3] the research productivity at MAK is at a much lower level than at UCT. One important factor responsible for this is the difference in the sources of research funding for the two institutions. In 2013, almost 80% of MAK's research funding came from foreign (either national or supranational) donor agencies, while practically no research funding was acquired from competitive basic research funding programmes, coordinated by national or supranational research councils (see Figure 6.1). UCT's research funding situation is more in line with the situation at the world's top research universities; that is, a considerable part of the research income of UCT is the result of its academic staff being successful in the competition for external research funding. In many respects, the situation at MAK resembles the research funding situation at other universities involved in the HERANA project, with the exception of South Africa. Not only UCT, but also other South African universities, such as the Nelson Mandela Metropolitan University (NMMU), operate on a significantly different research income basis from MAK (see Figure 6.1).

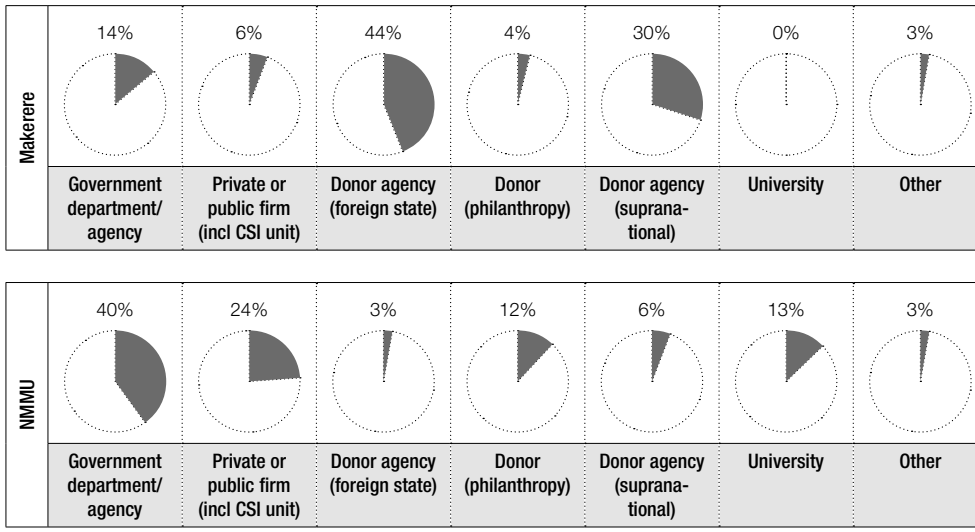
As discussed elsewhere (Maassen 2012), the investments of donor agencies in research projects at sub-Saharan universities, such as MAK, have a number of characteristics that contribute to the low research productivity of these universities. First, in general, donor research funding is not distributed through an open competition, relying on peer review to select the projects that are best academically. Second, donor agencies in general do not require the academics who receive funding from them for a research project to produce academic publications. Third, most donor-funded research projects resemble more of a consultancy activity than an academic research project. Fourth, there is hardly any coordination between donor agencies when it comes to the investments in research projects in sub-Saharan African universities. Overall, the individual donor agency's programmes and ideologies seem to be a

2 This has not only been a concern faced by academics seeking research funding – see, for example, Santamaria (2014).

3 In 2013, research income at MAK was USD 85.10 million compared to USD 93.18 million at UCT (data sources: Department of Institutional Planning at MAK and Department of Institutional Planning at UCT).

more important factor in the determination of which research project should receive donor funding than national and/or institutional research policies and strategies in the receiving countries and institutions. Fifth, donor agencies prefer in general to have direct contact with the academics who receive donor research funding. A consequence of this is the 'projectisation' nature of donor research funding; that is, donor agencies invest in projects, not in institutions, despite all the recent donor programme emphasis on 'capacity building'. The situation at MAK shows how difficult it is for an ambitious African research university to realise its institutional research strategies, when almost 80% of the institutional research funding comes from donors who prefer to invest on the basis of their own programmes and ideologies in individual projects.

Figure 6.1 Makerere and Nelson Mandela Metropolitan University: Research project funding by funding type (2013)



Source: Van Schalkwyk (2014)

Research culture

Research, like all other human endeavours, takes place in a social environment where individuals and groups are driven by different beliefs and attitudes towards their roles. These beliefs are often intangible or invisible and become stronger over time. Clark (1983: 72, 73) notes that every organisation possesses a 'symbolic side' that allows members to share common beliefs and stories. The symbolic side of research is usually neglected as people tend to pay more attention to the more visible and quantifiable elements, such as the number and quality of research publications, and research funds. In the context of universities in sub-Saharan Africa, it is crucial to examine the practical realities that contrast with the rhetoric in institutional strategic plans.

Although the MAK strategic plan clearly presents knowledge generation as one of its main goals, the findings of this study reveal that academics regarded the research culture as more a reflection of, and aligned to, funding opportunities than to organisational structures. The nature of research projects was mainly influenced by donor funding, which usually came with a financial reward for the academics. As such, most academics found themselves engaging in research in order to supplement their relatively low salaries with the income from donor projects. Such research was also characterised as an individualised enterprise, where the more ambitious faculty were the most research-active. Two categories of faculty members came across as active: the senior professors, who had strong donor and peer contacts, and the junior academics, who sought promotion to move up the career ladder and thus needed to be involved in research projects and to produce scholarly publications. This strongly suggests that the organisational research culture is still rather weak, thus leaving academic research in practice in the hands of a few active individuals.

Strikingly, when the administrators were interviewed with respect to their thoughts on MAK's research culture, they noted that despite the key challenges, the research output in the university was increasing. They also noted that MAK was still a 'magnet' for many foreign donors and that the number of donor-funded projects had doubled over the last five years.

Conclusion

The study underlying this chapter has explored faculty perceptions and experiences with respect to the factors that influence research productivity at MAK. Of the four main factors identified – individual factors, organisational factors, funding and research culture – funding has been found to have a major impact on the nature and sustainability of research capacity at MAK and, consequently, on the university's research productivity. The contextual realities of academics, such as the low salaries, absence of incentive structures, the poor infrastructure, and the lack of a professional research management are, to a large extent, a result of the lack of consistent and adequate funding earmarked for research. This is not the result of a lack of research funding per se, since MAK's level of research income can be compared to the level of research funding at UCT. Rather, the nature and source of research funding are of relevance here. Almost 80% of MAK's research income comes from donor agencies implying that the institutional leadership has limited to no influence on how this money is invested in the institution's research activities. Consequently, unlike the situation in research universities in the OECD, or even South Africa, the institutional leadership at MAK lacks the level of institutional research income needed to build an adequate academic and infrastructural foundation for institutional research activities. This makes it very difficult for a university such as MAK to develop a collective, organisational dimension in its research activities. In practice this implies that the research funding situation at MAK is one of the main factors

contributing to the weak coupling between institutional research strategies and the individual academics' research activities (or lack thereof).

Nonetheless, more can be done to stimulate the development of a stronger research culture in the institution. MAK's human resource policy should go beyond stimulating academic staff members with PhD degrees to, in the first place, engage in teaching. As for now, tenured academic staff members have no accountability to the institution with regard to engagement in research. On the other hand, the institution could stimulate the strengthening of an institutional research culture by introducing adequate incentives and rewards for academics who engage in research. The situation currently, in which MAK uses the income from tuition fees generated from privately sponsored students to pay lecturers who have additional teaching loads (evening, weekend and extra-mural), does not contribute in one way or another to strengthen the institutional research culture.

When the academics were asked to rank the four major factors (organisational, individual, funding and research culture) in terms of importance for them personally, many of them acknowledged the role of individual factors in determining the success of any academic researcher around the world. However, in their specific institutional context, funding played a greater role when it came to its impact on creating a sense of career- continuity for individual researchers. At the same time, the nature of the research funding practice at MAK was also responsible for making (and keeping) research as an individualised activity. There is hardly any collective (i.e. institutional) component in research funding at MAK, implying a loose coupling between the institutional research ambitions and strategies, and the individual academic staff members' (lack of) engagement in research activities.

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CHAPTER 7

ACADEMIC INCENTIVES FOR KNOWLEDGE PRODUCTION IN AFRICA: CASE STUDIES OF MOZAMBIQUE AND KENYA

Gerald Wangenge-Ouma, Agnes Lutomiah and Patrício Langa

Introduction

This chapter seeks to understand how financial incentives shape academic productivity as measured by academic publishing and the successful supervision of postgraduate students. More generally, we ask the questions: What is the role of incentives in the production of academic core products? And, can they be harnessed by policy levers to promote productivity? The paper draws its data from two countries and two higher education institutions: Eduardo Mondlane University (UEM) in Mozambique and the University of Nairobi (UoN) in Kenya. The case studies examine two important and related aspects; that is, the incentives in place and the remuneration of selected public sectors in Mozambique, to establish how the professoriate is paid compared to other professions, and the incentives at the UoN and how these incentives shape academic productivity.

What drives academics to be more or less productive in their core academic activities – teaching, research and dissemination of their results through publishing? This question is frequently asked, but the answers are far from uncontested. What is most remarkable about them invariably falls into two apparently antagonistic categories. The first category provides answers in terms of the academic ethos of 'publish or perish' – a phrase devised to define the pressure in academia to rapidly and continuously publish academic work to sustain or further one's career. The idea that academics publish their work to pursue peer recognition, in a Bourdieuan sense, is also part of the academic ethos. For Bourdieu, 'each field calls forth and gives life to a specific form of interest, *a specific illusion*, as tacit recognition of the values of the stakes of the game and as practical mastery of its rules' (Bourdieu & Wacquant 1992: 117, original emphasis). In other words, traditionally, academics strive to publish more because

it is part of the rules of the game of academia to compete for recognition through certain output measures, namely, number of followers, citation indexes, postgraduate students and publication in impact-factored journals. The second category of answers suggests that academics are living in an era of academic productivism characterised, in part, by the emergence of the 'evaluative state' – an expression that refers to strong state intervention in the social field of academia, and the liberalisation of the economy (Sguissardi 2006). According to this view, the state gives more freedom to the management of resources and processes such as efficiency and productivity, and can therefore justify a decrease in funding and create conditions for the expansion of privatisation and an entrepreneurial mindset in (higher) education (Langa 2012; Texeira & Dill 2011; Wangenge-Ouma 2008). On the other hand, the state also exerts tight control over the purposes and products of higher education institutions through evaluative mechanisms (Sobrinho 2003) via, amongst others, league tables and funding mechanisms. A key consequence of this state evaluative regime is a new accountability model that puts pressure on academics to produce more.

Our main argument is that academic incentives for knowledge production, particularly in the context of marketisation, constitute a response to the new competitive environment, particularly in the knowledge economy paradigm. That is, the academic incentives regimes for knowledge production are part of a global trend in the political economy of knowledge production and a strategy for resource acquisition and accumulation, namely, students, talented researchers, funding, prestige (rankings), and legitimacy for universities (Wangenge-Ouma & Langa 2010). Academic incentives that are instituted in various higher education and science management systems serve purposes manifest in two main forms: in explicit ways, as in capital investment and productivity strategies where, for instance, universities provide direct monetary rewards for each peer-reviewed publication or masters and doctoral graduate, and then urge academics to increase their levels of production and productivity; and in less explicit ways, where universities establish competitive research funds to promote excellence in research, and strengthen their training of masters and doctoral students. In the latter form, universities usually do not directly pay academics for research productivity but make funds available to incentivise them to increase their research productivity, mainly to enhance institutional prestige, visibility and competitiveness.

Theoretical perspectives on academic incentives

When we started research on the studies reported in this chapter two years ago, the notion of incentives vis-á-vis academic productivity had not populated the internet galaxy as it has today. Jean Tirole had not yet won the Nobel Prize in Economics rewarding his work on, amongst other topics, incentives. In a 2003 paper, Tirole and his colleague, Bénabou, argued that 'a central tenet of economics is that individuals respond to incentives. For psychologists and sociologists, in contrast, rewards and punishments are often counterproductive, because

they undermine "intrinsic motivation"' (Bénabou & Tirole 2003: 489). In their seminal work, Bénabou and Tirole (2003) reconcile these two views, showing how performance incentives offered by an informed principal can adversely impact an agent's perception of the task, or of his own abilities. For the authors, incentives are then only weak reinforcers in the short run and negative reinforcers in the long run. In their study, the two economists asked important questions pertaining to incentives (ibid.: 489):

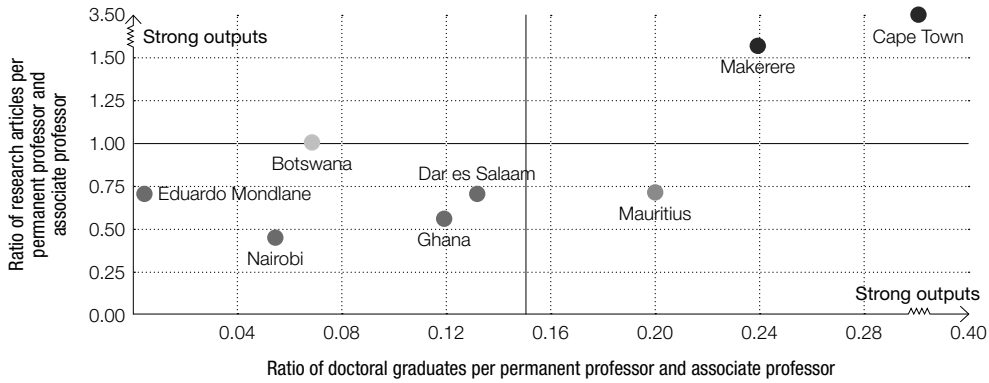
> *Should a child be rewarded for passing an exam, or paid to read a book? What impact do empowerment and monitoring have on employees' morale and productivity? Does receiving help boost or hurt self-esteem? Why do incentives work well in some contexts, but appear counterproductive in others? Why do people sometimes undermine the self-confidence of others on whose effort and initiative they depend?*

In our own research on academic production and productivity, we asked similar questions: Should academics be rewarded for publishing a paper in a journal or a book, or be paid to undertake a research project? Should academics be rewarded to supervise postgraduate students? Is it because of the lack of rewards for undertaking academic core activities that African scholars are, by and large, less productive than their counterparts in Europe, America and Asia? In our research, we examine what drives African academics to engage in or refrain from academic core activities. We are interested in investigating the financial and non-financial rewards and awards practices that are in place to incentivise academics to be more productive. Our focus is directed to the kinds of incentives in place for academics to engage in academic core activities such as research production, training of postgraduates, particularly masters and doctoral students, and dissemination of their research through journal publications. The questions we ask are informed by previous research conducted on the performance of African universities in research as part of the Higher Education Research and Advocacy Network in Africa (HERANA).

Data indicates that institutions like UEM and UoN, when compared to several African peers, underperform in the major 'academic core' activities. For instance, the University of Cape Town tops the rank of doctoral graduates per professor or associate professor, and research articles per professor or associate professor compared with UEM or UoN, which, as shown in Figure 7.1, are placed at the bottom of the first quadrant.

It terms of research publication, the disparity is also significant amongst the eight African universities involved in the HERANA project, including UEM and UoN. This is in line with the common understanding that African universities are lagging behind their counterparts in Europe, America and Asia in terms of knowledge production. For instance, according to Cloete (2014), publications in Africa increased from 11 776 in 2002 to 19 650 in 2008, a growth of 66.9%. Africa's world share increased from 1.6% to 2%, Latin America from 3.8% to 4.9%, and Asia from 24.2% to 30.7%. From 2000–2008, Asia's share of researchers rose from 35.2% to 38.2% and Latin America from 3.0% to 3.8%, while Africa's share fell from 2.2% to 2.1%. If Africa were a country, it would be just behind India, China and Brazil in publication output.

Figure 7.1 Ratios of high-level knowledge outputs to professors and associate professors



Source: Bunting et al. (2014b)

While economic models of compensation treat pay practices as a solution to an incentive problem, classical sociology has established 'disinterestedness' as a core value and norm of the academic enterprise. As such, disinterestedness carries with it the expectation that scientists should have no emotional or financial attachments to their work (Macfarlane & Cheng 2008). Merton (1942) assigned high moral standards of personal integrity to scientists who, he argued, were motivated and rewarded through recognition of their achievements rather than monetary gain. Scientists, according to Merton (ibid.), are interested in finding out the truth even if the truth proves the scientist wrong. For Merton, recognition is a form of intellectual property. Since science puts a premium on originality and on advancing the field, there is intense pressure on 'being first'. This is where the rewards are found; for those who are not acknowledged, their accomplishments are forgotten.

The principal-agent theory offers a counter-position to Merton's postulation on the drive for academic productivity. In a principal-agent relationship, principal(s) with a mission and organisational resources delegate tasks to agent(s) with specialised skills and knowledge to help in achieving certain goals (Eisenhardt 1989; Jensen & Meckling 1976; Laffont & Martimort 2002; Sappington 1991). Theoretically, '(monetary) incentives work by increasing effort which, in turn, leads to an increase in performance' (Bonner & Sprinkle 2002: 304). According to Stiglitz (1987), the main challenge in this regard is devising incentive schemes that will trigger maximum effort by the agent.

The principal-agent model is based on several assumptions: namely, principals are risk-neutral or risk-averse, agents are risk-averse or risk-neutral, and all parties in the principal-agent relationship are rational and utility maximisers; (material) incentives are essential and sufficient to motivate employees' work; and, higher sums of monetary compensation (monetary incentives) yield higher effort (if impossible for the agents to shirk). Importantly, according to the principal-agent model following the rationality assumption, the incentive pay positively affects the agents' effort.

Inherent to this theory is the potential conflict of interest between the principal(s) and the agent(s). The agency problems may arise because each individual actor in the principal-agent relationship acts in his/her own self-interest (Laffont & Martimort 2002: 2). The principal-agent model predicts that based on the notion of conflicting goals and expectations in a principal-agent relationship, the individual agents will shirk (i.e. put no effort into) a task if it makes no contribution to their economic value or is not incentivised (Sappington 1991). The model dictates that the principal will try to reduce the shirking by monitoring the actions of the agents, and by offering the agents incentives in an effort to align the agent(s)' interests with the principal(s)' objectives.

Overall, the principal-agent model suggests that incentives influence the utility of various outcomes, and effort has an effect on the possibility of attaining the outcomes. These notions are similar to the predictions of Vroom's (1964) expectancy theory that individuals will improve their effort to increase their effort if they expect outcomes (incentives) (see also Lunenberg 2011). Bonner and Sprinkle (2002: 308) emphasise that 'incentives, such as monetary [rewards], increase an individual's desire to increase performance and concomitant pay.' Bonner and Sprinkle further claim that the individuals' desire makes them put more effort into the task because more effort is likely to increase performance, and the increase in performance could result in more of the desired incentives. The above influence turns out to be a rotational process. However, empirical findings show contradictory outcomes from the use of monetary incentives (Gneezy et al. 2011). As observed earlier, the influence of money is not as linear and predictable as suggested by Bonner and others.

Applied to academics, we use the model to understand (a) how research-related incentives have shaped research behaviour, and (b) considering that academics tend to have multiple 'principals', who incentivise different outputs (research, consultancy reports, extra teaching, etc.), how the existence of competing incentives, which often require mutually exclusive responses, have affected the engendering of a robust research culture.

The use of this model in a higher education context has to consider its several limitations and implicit assumptions. The main limitation is that the model does not consider the possibility of multiple principals (Ntshoe & De Villiers 2008). Frey and Neckermann (2009: 3) correctly argue that in academic contexts 'there is more than one single clear-cut principal-agent relationship relevant for setting incentives'. Academics tend to have multiple principals simultaneously, namely, the leadership of the university at various levels – from the vice-chancellor to the head of department; the commission(s) of university education; foundations; research councils; professional societies; staff unions; and the scholars in their respective disciplines (Frey & Neckermann 2009; Ntshoe & De Villiers 2008). In this context of multiple principals, there exists the possibility of conflicting interests among the principals and conflicting incentives provided by them, which leads Shapiro (2005: 267) to ask the important question: 'how do agents understand and reconcile duties delegated to them when they are receiving mixed messages and conflicting instructions, as well as incentives from multiple principals?' Other limitations of the principal-agent model include

the assumption of a perfect commitment from both the agent and principal in terms of their interests and goals; a (mis)understanding of pay (incentives) as a linear function of output; and that the agent is committed to doing only one job. The study acknowledges these weaknesses in the analysis.

Methodology

The studies reported in this chapter were part of a bigger research project undertaken at four universities, namely, the University of Cape Town, Makerere University, the UoN and UEM. This chapter reports on some of the results from UEM and UoN. The two case studies utilised different methodologies given their distinct foci. While from UEM we mainly present and analyse quantitative data comparing university salaries with those of other industries, from Kenya we utilise mainly qualitative data to understand the link between competing financial incentives and research productivity. In both cases, we describe the mechanisms in place to reward academics for their work.

Data sources for the UEM case study included the National Strategic Planning for Higher Education (2012–2020), the UEM Research Policy, the UEM Academic staff career regulation, and two research reports, namely, a compilation of *50 Years of Legislation and Policy in Higher Education in Mozambique* (see Langa et al. 2014), and a *Report on the Evaluation of the UEM Strategic Plan 2008–2014*.

As for the UoN case study, data was mainly obtained using a survey and structured interviews with 50 academics and academic administrators (i.e. heads of departments, deans and directors). Only academics who had doctoral degrees, were involved in supervising masters and PhD students, and were engaged in research, were included in the study. The selection criteria were premised on the understanding that since these academics were 'research-active', they were better positioned to provide useful experiential insights on issues of incentives, knowledge production and research funding. Document analysis was also conducted. Some of the documents that were consulted include the UoN research policy (June 2008); the report of the management board committee to review policy on training, promotion and establishment (May 2006); the report of the Kenya Institute of Public Policy, Research and Analysis on wage differentials in the public-private sector (2013); and a Memorandum of Agreement between the UoN and the University Academic Staff Union regarding basic salaries and housing allowances for the academic staff.

Overall, document review for the two case studies involved institutional documents, such as research policies, reports on training and promotion, strategic plans and staff handbooks; documents on collective bargaining agreements on salaries and allowances; and reports from government departments.

Incentives for knowledge production in Mozambique

Over the last two decades, higher education in Mozambique has experienced a dynamic expansion and diversification of institutions of higher learning (Beverwijk 2005; Langa 2006, 2013, 2014). From one institution in 1962, the country now has 18 public and 30 private higher education institutions. In addition to the growth in the number of institutions, the growth in enrolments has also been substantial: from fewer than 5 000 students in 1989 to more than 130 000 students in 2004 (Langa 2014).

The phenomenal growth in the number of higher education institutions and enrolments has unfortunately not been replicated with regards to knowledge production and postgraduate enrolment and outputs. Monteiro (2010) argues that the country lacks a robust research culture that is manifested, amongst others, in low research outputs (see also Bunting et al. 2014) and low postgraduate enrolments. At UEM, which is the largest university in Mozambique in terms of student enrolments, more than 95% of enrolled students are undergraduates (ibid.).

Notwithstanding the current low levels of research productivity, all major policy documents advocate for the need to 'encourage scientific research as a means of training students, solving societal problems and supporting the development of the country' (Langa et al. 2014: 142). The remuneration policy for higher education personnel constitutes a particular strategy advocated by the Mozambican government to encourage individuals to pursue academic careers and enhance research productivity. Related to remuneration vis-á-vis research productivity, the country's *Higher Education Strategic Plan* (2012–2020) emphasises the need to link progression in academic careers to academic and research performance. Equally, the country's laws governing higher education have since been amended (in 2003 and 2009) to provide for, amongst others, performance evaluation for promotions, award of grants, provision of tenure opportunities for staff, among other considerations (ibid.: 188).

In 2006, the Ministry of Science and Technology approved new regulations as part of the country's science and technology strategy that could be regarded as research incentives. These regulations provide the following specific salary supplements for researchers: a 35% exclusivity subsidy of the basic salary for full-time researchers in public research entities or a higher education institution; and a 20% risk subsidy off the basic salary linked to research activities. The regulations also make provision for innovation, scientific discoveries and inventions. According to these regulations, researchers are entitled to a share of the research income that they generate (Langa et al. 2014). However, hardly any of these incentives have been implemented. At the institutional level, the UEM's research policy (2008) makes provisions for research incentives, namely, a fund for rewarding publications in international peer-reviewed journals, and technology innovations; and a fund to support the publication of research results, extension and/or consultancy works in national or international scientific magazines. These incentives have also not been implemented.

Thus, other than the indirect incentives linked to career progression, there are no direct incentives for knowledge production and research dissemination through publications in

the Mozambican higher education system, at either the national or institutional levels. It is through double-teaching (and moonlighting), particularly in the increasing number of private higher education institutions and in programmes with non-state-subsidised (full-fee-paying) students in the public institutions, that most academics can directly supplement their salaries.

This phenomenon has been examined by Mamdani (2007; see also Wangenge-Ouma 2008, 2012) at Makerere University, in what he termed the commercialisation of higher education. The distinction drawn by Mamdani between privatisation, related to the external relationship between the market and the university, and commercialisation, linked to the internal processes of knowledge production in the university, is instructive. Likewise in Mozambique, privatisation is an external relationship between the market and UEM (and other public universities) whereby the university opened up its gates to fee-paying students. Commercialisation, manifested mainly in the full-fee-paying programmes and a pervasive culture of consultancy, has had significant implications for UEM – mainly, the undermining of the possibility of establishing a research culture and the de-institutionalisation of science (Mouton 2008; Mouton et al. 2008). Following Mozambique's independence in 1975, most research took place within public institutions. However, the proliferation of non-governmental organisations (NGOs) during the 1990s has since changed the dominance of public institutions in research. Thus, one of the main features of the de-institutionalisation of research in, especially, public universities is a trend whereby academics establish research NGOs outside of the universities, and then utilise their international networks to secure funding from international agencies. This 'NGO-isation' of science is partly as a result of inadequate academic incentives and rewards, poor salaries and, above all, a deteriorating academic and research environment.

Remuneration of academics

In the Mozambican case study, the basic salaries of academic staff in public universities were compared to those of other professionals in the civil service, in order to test the generally held view that academics in African universities were relatively underpaid, hence the low levels of (research) productivity. The public service professionals whose salaries were compared to those of academics included diplomats and tax and judicial officials. As argued by Altbach et al. (2012), universities are regarded as privileged spaces for the production and dissemination of knowledge, and university lecturers and researchers are important actors in this process. Therefore, one would expect that in a world where knowledge shapes economic development, the academic profession would be highly appreciated and generously compensated.

In this context, we only compared the basic salaries of academic staff in Mozambique with those of highly paid (by Mozambican standards) public sector professionals (see Appendix Table A7.1). Our main conclusion is that, by and large, there are no major differences in terms of basic salaries between the academic profession and the other three selected professions. As shown by Appendix Tables A7.1 to A7.4, the basic salary of a full professor is higher than that

of an ambassador, across all the four salary scales. Generally, the basic salary of academics is better than that of diplomats.

The data in Appendix Table A7.5 is quite instructive. It shows that researchers[1] in public universities and research institutes are underpaid compared to those hired in the teaching track. While the highest paid professor earns a basic monthly salary of USD 1 507.52, his/her equivalent in the research track earns USD 1 020.55, a significant difference of about USD 500.[2] Thus, from a remuneration/incentive point of view, it is more lucrative to follow a teaching track than a research career track. At the UEM, this is evidenced by the fact that out of about 1 700 academic staff, fewer than 100 have taken the research career track. This small number of researchers should not be surprising if, as predicted by the principal agent-theory, would-be researchers as economic agents are utility-maximisers who must 'look out for themselves'. From this perspective, choosing a research career would not be a rational choice.

Incentives for knowledge production in Kenya

Higher education in Kenya has witnessed a number of important developments since 1970 when the country's oldest university, the UoN, became a fully fledged university. Currently, the country has 22 public and 36 private universities. The total student enrolment in the higher education sector has increased significantly: in 2012, the total student enrolment in public universities stood at 240 551, a significant increase from 571 students in 1963 (Nganga 2013). Other important features of Kenya's higher education system include the following:

- State funding of higher education has been declining over the years. Wangenge-Ouma (2008) shows that during the period 1996–2000, government funding of Kenya's university education was about 0.94% of the gross domestic product and declined to 0.74% during the period 2000–2005.
- All public universities have introduced full-fee-paying programmes, mainly to mitigate resource-dependence difficulties arising from inadequate state funding (Kiamba 2004; Wangenge-Ouma 2008, 2012). As in the case of Mozambique, the full-fee-paying programmes entail the admission of students who pay premium fees over and above those subsidised directly by the state. Academics who teach on these programmes receive additional payments over and above their regular salaries.
- Basic salaries are determined at the national level, with the academic unions mobilising the lower and upper limits of the salaries through collective bargaining agreements. Table 7.1 indicates the shifts in the monthly basic salaries of full professors compared to

1 In Mozambique, the academic profession in the public higher education system has two career tracks, namely, a teaching track and a research career track.

2 In comparison to the disparities between the income of senior academics and senior researchers, the difference between junior academics and researchers is negligible.

those of permanent secretaries (administrative heads of ministries) from 1963 to 2014. The comparison with the basic salaries of permanent secretaries is due to a persistent reference by Kenyan academics to the salaries earned by these civil servants as evidence that their (academics') purchasing power has consistently declined over time, while that of the permanent secretaries has significantly increased.

Table 7.1 Average basic salaries of academics and permanent secretaries in Kenya

Year	Professor		Permanent secretary		Paid ratio
	Kenya Shillings	*USD*	*Kenya Shillings*	*USD*	
1963	2 250	35	3 625	42	1.2:1
1973	3 050	40	6 600	88	2.1:1
1980	10 500	140	12 600	168	1.2:1
1990	18 788	250	24 725	329	1.3:1
2004	53 550	714	96 000	1 280	1.7:1
2014	162 064	2 187	200 000	2 667	1.2:1

Source: Lutomiah (2014)

From Table 7.1 above it is evident that there was no significant difference between the paid ratios of the average monthly basic salaries of permanent secretaries and professors over the years – that is, with the exception of 1973 when a permanent secretary earned twice as much as a professor. The claims of the permanent secretaries receiving high salaries is the result of a slate of allowances (house, transport, car purchases and entertainment) and other entitlements that are offered to the permanent secretaries in comparison with the professors. As a result of the huge allowances earned by permanent secretaries, the current wage gap between the monthly gross salaries of professors and permanent secretaries stands at 7:1, hence, the regular claims of poor pay in the universities compared to salaries of other civil servants (Lutomiah 2014).

Regarding knowledge production, while Kenya is ranked among the top knowledge producers in Africa (UNESCO 2010), it remains a low knowledge-producing country. This low knowledge production is evidenced by factors such as low doctoral enrolments and outputs, and low publication outputs. For instance, a study by Cloete et al. (2011) shows low levels of publication outputs at UoN at the ratio of 0.11 per permanent academic staff, implying production of only one article in ten years.[3]

Incentives available to academics

Several incentives are available to academics at UoN. A typology of these incentives is provided below (UoN 2006, 2008):

3 The study considered only articles referenced in the Thomson-Reuters Web of Science databases.

- Direct financial compensation such as pay (basic salaries);
- Other direct financial incentives such as benefits and allowances (sabbatical leave, paid study leave, house allowances), research funding (fellowships and scholarships, travel assistance to conferences), research infrastructure (library resources, equipment, computers and computer software, laboratory and internet), and monetary allowances for publications and successful supervision of postgraduate students;
- Indirect financial incentives such as promotion opportunities; and
- Non-financial rewards such as time resources, advocacy for a balanced workload, and recognition through public acknowledgement.

As the analysis will show, the incentives described above are provided by multiple principals who, not uncommonly, drive mutually exclusive responses. The main principals are: the university itself (also made up of multiple principals – from the vice-chancellor to heads of departments); the national research council; and government and external agencies (mainly NGOs) that regularly engage academics as consultants.

Incentives linked to knowledge production

There are several incentives linked to research and successful masters and PhD supervision at the UoN. These incentives are discussed in the sections that follow.

Promotion opportunities

UoN policy shows that promotion is one of the incentive opportunities attached to research and successful postgraduate student supervision. A review of the promotion policy of UoN and the interview responses show that promotion was largely dependent upon the academic's research productivity and wide experience in postgraduate student supervision, which are evaluated regularly (UoN 2006). Institutional documents show that UoN has five ranks for academic appointment: tutorial fellow/assistant lecturer, lecturer, senior lecturer, associate professor, and professor. According to institutional documents, the university has clear criteria for promoting staff (ibid.: 8). For promotion to a professorial position, PhD training is a key requirement. Teaching is also an important criterion, which may involve teaching at undergraduate and postgraduate levels, research training and mentoring. Similarly, there is an emphasis on postgraduate student supervision, where the candidates need to have successfully supervised to completion a minimum of three PhDs and five masters students. Research publishing is also a key factor insofar as the academic has to have produced a minimum of six publications in refereed journals, or three publications in refereed journals and three chapters in scholarly books, since the previous promotion. Lastly, evidence of scholarly activities or contribution, such as innovations, is also rewarded at the university (UoN 2006).

While the policy document mentions several outputs that are considered for promotion

to full professorship, the academics interviewed stated that much emphasis during promotion is on peer-reviewed articles in internationally recognised journals. Significantly, respondents reported that co-authorship with postgraduate students is strongly emphasised for promotion. To reinforce the above requirement, an academic staff member in the Faculty of Arts reported that:

> *I would say that one of the challenges that I had during the interviews [for promotion] is that I had not published any publications with my students. So the committee highly regards co-authorships and we are being encouraged to do that. (Interview, November 2012)*

The emphasis on publications and the successful supervision of masters and doctoral students for promotion purposes seems to have encouraged academics at UoN to pay more attention to these outputs. A dean in one of the faculties expressed his view as follows:

> *Since the time that promotion was attached to student supervision – recently, just three years ago – it has led to academics scrambling for students in my department and to be available for consultations on the research projects. (Interview, November 2012)*

Inasmuch as promotions were considered to be an important driver for performance, about half of the participants interviewed felt that the promotion system was not transparent, consistent or fair, and that it took too long for one to be promoted, despite having achieved high-performance ratings and met the promotion criteria.

Based on the above analysis, notwithstanding the weaknesses mentioned in connection with promotion opportunities, there is compelling evidence that promotions to senior levels at UoN are based to a great extent on research productivity. From the interviews, it can be argued that this incentive has triggered positive responses from academics with regards to the supervision of postgraduate students and publishing refereed papers.

Financial allowances for successful supervision and publications

Inasmuch as the review of policy documents shows that the university will set aside a budget for incentives for research and supervision, it is not explicit in the documents if financial allowances are directly attached to publications and the successful supervision of postgraduate students. However, from the interview data discussed below, it can be concluded that in some instances financial allowances are attached to research publications and supervision.

Generally, respondents interviewed believed that supervision at the university was seen as a de facto responsibility of academics and thus no rewards need to be attached to it. However, there were some cases where financial rewards were attached to successful supervision of masters and PhD students, particularly in the full-fee-paying programmes (Module II programmes). One of the deans interviewed stated that:

> *The staff are rewarded when they are supervising Module II students, who are tuition-fee-paying. This faculty has not developed a PhD programme that is self-sponsored – we are still on the old programme [Module I], but for the masters we have developed parallel programmes. Various departments have developed masters programmes that are self-sponsored, where students pay for supervision and the lecturer gets 30% of the total of the supervision fees. (Interview, November 2012)*

The rewarding of successful supervision of students in Module II programmes did not seem to be a university-wide practice, but one that was specific to particular faculties and departments. The provision of financial rewards for successful supervision was also practiced in cases where student funding (by external sources) provided for a financial allowance for supervision.

Other than the fact that rewards for successful supervision of postgraduate students were not systematically applied across the institution, academics expressed the view that the amounts for this reward were minimal and therefore did not have a useful impact on productivity levels. Respondents generally regarded the amount as a token, and as a lecturer in the Faculty of Arts complained: 'The amount is too low to motivate anybody; it is miserable and has an insignificant impact.'

The National Commission for Science, Technology and Innovation has established a financial reward, ranging from USD 50 to USD 200, for academic researchers who publish their research in international peer-reviewed journals. This reward is only attached to full peer-reviewed journal articles, while other publications such as books, book chapters, editorials, comments and editor's notes are not recognised. There was no evidence of direct financial rewards by the university itself for publications.

Recognition for successful supervision and publications

The other incentives linked to research included non-monetary rewards such as recognition. Recognition may entail recognition through an outstanding researcher award at a departmental level; recognition through appointment to the professor emeritus position; and/or pronouncement of names in public, such as during graduation ceremonies. Following the recognition in public, their scholarly works similarly earn them recognition amongst their peers and students as well, which also comes with improved status and respect. A professor in the Faculty of Agriculture acknowledged this enhanced status following the public recognition of his research productivity thus: 'There are changes in the way the students see me as a professor; for instance, you see students and my colleagues being more receptive with my suggestions and criticisms than when I was a lecturer.'

Perceptions of academics towards the UoN research incentive regime

The general perception of academics was that the existing research incentive regime at UoN was weak, discontinuous and unsystematically applied. For instance, regarding promotions,

participants in the study argued that the procedures were unfair and influenced by 'politics' in the university, rather than the set criteria. As for incentives derived from Module II programmes, their application depended on the amount of revenues generated by individual programmes or colleges and, therefore, did not consistently influence desired responses. Monetary rewards attached to publications and supervision were said to be 'too little' to have a meaningful impact.

UoN academics also pointed out that inasmuch as key incentives such as promotion were linked to research publications and the supervision of PhD and masters students, research funding and heavy teaching remained a key challenge in the university. As promotion is heavily dependent upon research productivity, heavy teaching workloads (partly motivated by financial gain from Module II programmes) and inadequate research funding militates against a productive research enterprise. On the whole, while the university rewards research productivity, it had not established sufficient conditions that would encourage the maximisation of its research goals.

Competing incentives

The notion of competing incentives is derived from the understanding that academics tend to have multiple principals (Frey & Neckermann 2009; Ntshoe & De Villiers 2008), who, not uncommonly, reward different outputs such as research, consultancy reports or extra teaching. Responding to multiple principals and incentives may conflict with the incentives meant to reinforce research behaviour. Depending on the attraction to the different incentives, academics may focus on other activities that might not contribute to the mission areas of the university as intended by university principals. The data collected shows that apart from the research-related incentives provided by UoN, competing incentives existed that may not necessarily reinforce research behaviour. As discussed already, UoN academics work within an environment where multiple principals, including the university itself, the research council and the government, make attempts to reward research, although they are largely perceived to be inadequate. The same environment simultaneously rewards teaching on the Module II programmes handsomely and provides academics with consultancy opportunities. Unlike research incentives that seem uncertain and take long to materialise (e.g. through promotions), the competing incentives are fairly easy to earn. In this context, UoN academics often have to make 'trade-offs' in terms of which incentives to respond to. Some of these issues are reflected in the quotations below:

> *So you are paid so little, then there is no research money and the challenges of time. So what is really an environment conducive to working? Here we are employed for two things: we teach and do research. But there is no research money and the salary for teaching is very small. So we go out to look for our own income through consultancies and teaching on Module II which tend to be attractive. (Interview, November 2012)*

> *There are some people who teach evenings from Monday to Saturday … these are some of the people who may opt to teach and not do any research. And there is an attraction there because when you teach Monday to Friday you are assured of that money; when you refuse to teach and go out looking for either research money or consultancy, it's risky because you are not sure … since this is money that is assured they [academics] will want to teach more. (Interview, November 2012)*

From the above interview extracts, it appears that given the weak nature of research-related incentives, academics were attracted to other (non-research) incentives offered to them. It would seem that, contrary to Merton's postulation that scientists should have no emotional or financial attachments to their work (Marcfarlane & Cheng 2008), academics, like other economic agents are, after all, utility-maximisers who make 'rational' choices that are mostly guided by opportunity cost.

While UoN academics were making significant additional income from extra teaching on the full-fee-paying stream in the university, and also by moonlighting in private and other public universities, it also means that they were taking up heavy teaching loads. In this context, intensive research required for publishing in international peer-reviewed journals and postgraduate supervision becomes a poor competitor against extra teaching and consultancy.

Concluding observations

How incentives work, and how they can be utilised to achieve intended results, remains a contested issue. From an economic point of view, from which the principal-agent theory is derived, individuals respond to incentives. In other words, incentives can be used to trigger and sustain desired behaviour. However, this reward-driven influence on desired responses is regarded by some as undesirable, counterproductive and unsustainable (Bénabou & Tirole 2003). In a higher education context, the pursuit of science driven by external rewards, especially monetary rewards, is considered by some as anathema; as going against the traditional values of science (Macfarlane & Cheng 2008; Merton 1942). However, as our two case studies have shown, the pursuit of monetary rewards in academia is a reality and has implications for the advancement of core academic activities, namely, teaching, supervision of postgraduate students and research.

In Mozambique, our analysis has shown that while the remuneration of academics is generally on a par with, and in some cases better than, that of senior professionals in the public service, no direct incentives were provided to encourage research, even though existing policies provided for such incentives. What is instructive about the UEM case study is that, contrary to the common perception regarding the poor remuneration of African academics, Mozambican academics were actually competitively remunerated by Mozambican standards. However, as our analysis has shown, there seems to be no correlation between the competitive

remuneration of Mozambican academics and research productivity. Instead, and similar to the UoN case study, we see academics being attracted to more teaching, driven, of course, by financial rewards.

An important observation in the UEM case study is that responding to the often conflicting interests of multiple principals could have perverse implications for weak higher education institutions. This is exemplified by the de-institutionalisation of science at UEM whereby, for example, instead of pursuing research within the university and providing opportunities for socialising junior academics and postgraduate students into research, senior academics seem to prefer establishing entities outside of the university, which they use as vehicles to attract funding for research and consultancies. It can be argued that in this case, incentives for research (from international agencies) are applied in ways that, in fact, obviate its advancement in an institutional sense.

The key observation from the UoN case study is that there are competing incentives at the university that are provided by different principals: the university itself, the national research council, NGOs and other entities that offer consultancy opportunities to academics. These principals incentivise the production of different outputs, such as teaching on Module II programmes, publication of papers in international peer-reviewed journals, successful supervision of postgraduate students, and writing of consultancy reports. While the university places a premium on research and postgraduate supervision as evidenced in the promotions criteria, the existing incentives seem to encourage more teaching at the expense of research. This situation brings to the fore an important question posed by Shapiro (2005: 267), which is: How do agents understand and reconcile the duties delegated to them when they are receiving mixed messages and conflicting instructions and incentives from the multiple principals?

Thus, as a 'principal', UoN has not been successful in establishing an incentives regime that simultaneously encourages teaching and the maximisation of the university's research goals. As the analysis has shown, the general perception of UoN academics is that the incentives, especially those pertaining to research, are inadequate, discontinuous and not systematically applied across the university. The privileging of teaching over research should, however, be understood in the context of the university's key organisational goal of mitigating resource-dependence difficulties resulting from declining state funding. Students, through the Module II programmes, constitute the university's primary market for generating income and ensuring organisational survival. The pursuit for organisational survival has led to over-enrolment of students beyond the university's existing capacity (Wangenge-Ouma 2008, 2012), meaning that most of the university's academics have teaching commitments throughout the year. The privileging of teaching seems to make sense from a resource-dependence perspective: the university needs resources in order to exist as an organisation that can, amongst others, pursue research. So far, these resources have been derived from teaching.

Overall, from the two case studies it can be argued that while the existing incentives for research are weak and 'crowded out' by other incentives, especially those for teaching, it would

also seem that the existing conditions at the universities (such as heavy teaching loads) do not encourage a thriving research culture. Thus, while incentives can be utilised to leverage research productivity, their success seems to require the presence of an institutional culture that supports research actively – be it through a consistent application of the promotions criteria, mentorship of young academics to become established researchers, research capacity-building, and/or the provision of research funding.

An instructive observation from the two case studies is the weak participation of the state in supporting and encouraging research by making resources available. Ironically, in both cases, national policy documents talk about encouraging research and utilising knowledge to advance the respective countries. This weak participation of the state in supporting research is indicative of the absence of a primary 'principal' for research in both countries. As a consequence, it is not surprising that existing incentives for research from the multiple principals are inadequate, fragmented, and are applied, as shown in the case of Mozambique, in ways that actually weaken the research enterprise in higher education institutions.

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Appendix tables

Note: Amounts calculated according to Mid-Market Exchange Rates (as at 2013-08-11 08:58 UTC): MZN 1 = USD 0.0338639; USD 1 = MZN 29.5300

Table A7.1 Basic salaries of academic staff (2013) (in USD)

	Range			
Category	*1*	*2*	*3*	*4*
Full professor	1 345.41	1 394.04	1 448.09	1 507.52
Associate professor	1 021.23	1 064.44	1 102.27	1 150.90
Assistant professor	842.91	869.93	907.76	940.16
Junior lecturer	653.81	675.42	697.02	713.24
Teaching assistant	540.33	639.05	632.21	–

Source: www.meusalario.org

Table A7.2 Basic salaries of professionals in diplomatic careers (2013) (in USD)

	Range			
Category	*1*	*2*	*3*	*4*
Ambassador	1 297.08	1 332.27	1 372.50	1 412.69
Plenipotentiary Minister	1 085.91	1 116.08	1 151.26	1 186.48
Counselor Minister	909.95	935.11	965.25	990.41
Counselor	759.12	784.28	804.40	829.52
First Secretary	638.46	653.57	673.68	693.76
Second Secretary	568.10	583.16	598.27	618.38
Third Secretary	502.74	517.81	532.91	547.98

Source: www.meusalario.org

Table A7.3 Basic salaries of professionals from the tax authorities (2013) (in USD)

	Range			
Categories	*1*	*2*	*3*	*4*
Higher Tax Officers				
General Tax Commissioner	1 522.21	1 550.45	1 578.69	1 606.94
Tax Commissioner	1 292.85	1 321.09	1 349.33	1 377.58
Tax Sub-Commissioner	1 127.56	1 184.01	1 184.01	1 218.35
Tax Superintendent	1 022.18	11 050.42	1 078.63	1 106.87
Tax Officer (technician)				
Tax Inspector	870.64	905.07	939.51	973.95
Tax Sub-Inspector	709.44	751.47	793.49	835.48

Source: www.meusalario.org

Table A7.4 Basic salaries of professionals in the judicial system (2013) (in USD)

Categories	Range		
	1	*2*	*3*
Judiciary			
Taxation Judge	1 885.37	1 948.66	2 009.87
Judge A	1 138.80	1 202.09	1 265.35
Judge B	974.33	1 037.58	1 100.84
Judge C	822.48	885.74	949.03
Judge D	657.97	721.26	784.52
Magistrates (Public Prosecutor)			
Deputy Public Prosecutor	1 885.37	1 948.66	2 011.92
Public Prosecutor	1 138.80	1 202.09	1 745.00
Public Prosecutor 1st Class	974.33	1 037.58	1 202.43
Public Prosecutor 2nd Class	822.48	885.74	949.03
Public Prosecutor 3rd Class	657.97	721.26	784.52

Source: www.meusalario.org

Table A7.5 Basic salaries of researchers in public universities and research centres (2013) (in USD)

Category	Range			
	1	*2*	*3*	*4*
Research coordinator	904.94	940.12	980.35	1 020.55
Principal researcher	774.22	804.40	839.58	869.75
Researcher	663.63	688.75	713.88	744.05
Junior researcher	563.08	588.21	613.34	638.46
Research assistant	502.74	522.85	542.97	563.08

Source: www.meusalario.org

CHAPTER 8

FUNCTIONS OF SCIENCE GRANTING COUNCILS IN SUB-SAHARAN AFRICA

Johann Mouton, Jacques Gaillard and Milandré van Lill

Background

Science granting councils (SGCs) (and agencies with equivalent missions such as national commissions for science and technology, national sciences councils and national academies of science) are essential actors in national systems of innovation. In well-defined and clearly articulated systems of innovation they perform a number of crucial functions that contribute to the effective and efficient functioning of such systems, amongst others: disbursing funds for research and development (R&D); building research capacity through appropriate scholarships and bursaries; setting and monitoring research agendas and priorities; advising on science, technology and innovation (STI) policies; managing bilateral and multilateral science and technology (S&T) agreements; and assessing the communication, uptake and impact of publicly funded research. Ideally, such councils act as fair and disinterested agents of government while, at the same time, representing the interests of the scientific community nationally, regionally and internationally. They are crucial 'intermediaries' in the flow of international funding and technical support to R&D-performing institutions in a country.

Despite the significance of these organisations, few systematic studies of SGCs and related organisations in Africa have been done. This is in contrast to a growing body of scholarship about the nature, roles, functions and impacts of such bodies elsewhere in the world (see, for example, Barrier 2011; Braun 1998; Geuna & Martin 2003; Gulbrandsen 2005; Hubert & Louvel 2012; Jouvenet 2011; Laudel 2006; Lepori et al. 2007a, 2007b; Theves et al. 2007; Van der Meulen & Rip 1998).

After the decline in the 1990s in support for S&T development in Africa, there is now a renewed realisation by most role-players in recognising the importance of developing STI capacity in developing countries. High-profile reports outlining new visions, priorities and directions for African STI have emerged, particularly the UNESCO *Higher Education,*

Research and Innovation: Changing Dynamics (Meek et al. 2009) report, the African Union's *African Innovation Outlook* (2010) and the UN Rio+20 Report (United Nations 2012) as well as the World Bank Africa strategy in strengthening competitiveness and employment. These reports call for the international community's intervention to assist in promoting technology development, transfer and utilisation in Africa to enhance knowledge to support African countries to develop effective STI institutions, and the concomitant capacity to become global knowledge partners. The African continent is lagging substantially behind the rest of the world with regards to STI. The UN Millennium Project Report (2009) argues that STI underpins every one of the Millennium Development Goals and, therefore, becomes a prerequisite for sustainable development.

Against this background, the Centre for Research on Evaluation, Science and Technology at Stellenbosch University was commissioned by the International Development Research Centre in December 2012 to undertake a study on SGCs in 17 countries in sub-Saharan Africa. The countries included in the study were: Botswana, Burkina Faso, Cameroon, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Mozambique, Namibia, Nigeria, Rwanda, Senegal, South Africa, Tanzania, Uganda, Zambia and Zimbabwe. The original project goal was to assess the strategic priorities, objectives and practices of SGCs in sub-Saharan Africa. In this chapter we report on the main findings of this study.

Science, technology and innovation systems in sub-Saharan Africa

SGCs are embedded in the science and innovation systems of their respective countries. In sub-Saharan Africa, the STI systems vary significantly with regard to socio-political histories, geography, political and economic (in)stability, colonial legacies and, most importantly (for this study), the degree of institutionalisation of R&D (Gaillard & Waast 1988; Mouton 2008). The R&D function of African STI systems is primarily located in universities, science councils, public research institutes and some research-based non-governmental organisations (Gaillard et al. 2005). There are few examples of well-established research institutes in the private sector or in industry.

Evolution and development of STI systems in sub-Saharan Africa

One of the first results of our study was to 'map' key milestones in S&T governance and policy development in each of the countries included in the study. These 'milestones' are presented in a comparative framework in Appendix Table A8.1, thus allowing for a comparison between each country's S&T trajectory and those of its continental counterparts.

Most African countries obtained their independence during the 1960s. But the establishment of a national ministry of science and technology (or equivalent ministry) would have to wait, in most cases, for another 20 years to materialise. In fact, in four countries (Namibia, Rwanda,

Tanzania and Uganda) there is as yet no such dedicated ministry. In most of these cases, the S&T portfolio is located in a ministry of higher education. One country, Cameroon, does not have a science policy document. These facts may point to a lack of commitment to prioritise S&T matters in these countries. On the other hand, we also found evidence of a recent commitment to prioritising S&T as illustrated by the fact that nine countries have revised their S&T policy documents since 2010.

The overarching impression that one gains from this overview of critical dates in the development and establishment of STI policies and institutions is that most of the countries in sub-Saharan Africa have only, in recent years, given sufficient priority to science and innovation matters. As we will see in the section below, a commitment to a science policy or ministry of science and technology is not sufficient if it is not accompanied by an investment in R&D in a country. The reality is that most governments in sub-Saharan Africa have until now only paid lip-service to prioritising S&T and allocating sufficient funding for research.

Investment in R&D

The New Partnership for Africa's Development (NEPAD) is the socio-economic development programme of the African Union. It is a high-level platform for developing policies and setting priorities on STI for African development. The STI vision of NEPAD is that of 'an Africa that is well integrated into the global economy and free of poverty' (NEPAD 2005). The overall goals are:

- To enable Africa to harness and apply science, technology and related innovations in order to eradicate poverty and achieve sustainable development; and
- To ensure that Africa contributes to the global pool of scientific knowledge and technological innovations.

In accordance with the NEPAD objectives, many African governments have committed themselves to increasing their gross domestic expenditure on R&D (GERD), and to put in place the necessary policies to enact such decisions by 2015. GERD is generally regarded as a measure of how dedicated a specific country is to supporting research. But the reality is that most sub-Saharan Africa countries spend less than 0.5% of their gross domestic product (GDP) on R&D (see Table 8.1). Nigeria, for example, lags far behind in that only 0.20% of its GDP is assigned towards the development of R&D (*African Innovation Outlook 2010*: 37). Unfortunately, not all sub-Saharan African countries' GERD is captured in the statistics below and Table 8.1 therefore does not present a comprehensive view of GERD in the region. However, it can be assumed that sub-Saharan Africa needs a timely injection of funds into STI and R&D.

Table 8.1 Gross domestic expenditure on R&D (GERD)

	African Innovation Outlook				UNESCO† Institute for Statistics
Country	Year	GERD Million PPPS	GERD per capita PPPS	GERD as % of GDP	GERD as % of GDP
Botswana	2005	n/a	n/a	0.38	0.52 (2005)
Burkina Faso	2009	n/a	n/a	0.18	0.20 (2009)
Cameroon	n/a	n/a	n/a	n/a	n/a
Côte d'Ivoire	n/a	n/a	n/a	n/a	n/a
Ethiopia	2005	n/a	n/a	0.2	0.24 (2010)
Ghana	2008	78.7	58.3	0.47	0.23 (2007)
Kenya	2007	277.8	7.4	0.38	0.42 (2007)
Malawi	2007	180.1	12.9	1.70	n/a
Mozambique*‡	2007	42.9	2.0	0.25	0.47 (2010)
Namibia	2005	n/a	n/a	0.3	n/a
Nigeria*†	2007	583.2	3.9	0.20	0.22 (2007)
Senegal	2008	99.0	8.0	0.48	0.37 (2008)
South Africa$^{\Omega}$	2010/11	4 976.6	102.4	0.76	0.87 (2009/10)
Tanzania*	2007	234.6	5.8	0.48	n/a
Uganda†	2007	359.8	11.6	1.10	0.41 (2009)
Zambia	2008	55.3	4.6	0.37	0.34 (2008)
Zimbabwe	2005	n/a	n/a	0.2	n/a

* Data do not include the business enterprise sector
† Data do not include private non-profit institutions/organisations
‡ Data do not include the higher education sector
Ω HSRC CESTII Report (August 2013)
† We have added an additional column to include the latest available UIS statistics on R&D investment for select countries

Source: African Union (2010: 34)[1]

It is also worth noting what percentage of GERD is sourced from funds abroad. Table 8.2 provides the available statistics as published in 2010 for those countries that source funds from abroad. Mozambique receives almost 58% of funding available for GERD from foreign sources, while Nigeria sources 99% of funding towards GERD internally. The figures suggest that sub-Saharan Africa, with the exception of Nigeria, South Africa and Ghana, is still heavily reliant on foreign funding as a source for R&D activities.

1 Cameroon and Côte d'Ivoire were not included in the survey.

Table 8.2 Dependency on foreign funding for R&D in 2010 (%) (sub-Saharan Africa only)

Country	Funds from abroad
Ghana	11.9
Kenya	17.6
Malawi	33.1
Mozambique	57.3
Nigeria	1.0
Senegal	38.3
South Africa	10.7
Tanzania	38.4
Uganda	12.8
Zambia	1.7

Source: African Union (2010: 40)

Research funding models

We now turn to a more detailed discussion of the nature, status and functions of national research funding bodies (in cases where such an entity exists), while also exploring the coordination of funding within national science institutions in terms of its integration, coordination or fragmentation. The former will consider the legal status of national funding bodies (granting councils) either as an entity within a ministry, a semi-autonomous public institution outside the ministry, a private foundation, and so forth.

Appendix Table A8.2 summarises the high-level results of our analysis of national STI funding arrangements in the 17 countries of interest. A three-level classification is used, specifying the *fund or funding programme;* whether the fund is embedded within or overseen by a *funding council* or equivalent body; and the relevant *ministry* that oversees either (or both) the funding council and fund. Where applicable, an attempt has been made to also distinguish between current and proposed funding arrangements.

The salient points emerging from the summary presented in Appendix Table A8.2 are highlighted below.

Differences between Anglophone and Francophone countries

As can be seen, a dedicated science funding council is largely a feature of the STI systems of countries in the Anglophone tradition (e.g. Kenya, South Africa, Uganda, Zambia and Zimbabwe). In the Francophone countries, such as Rwanda and Cameroon, there are no STI funding councils (although a project to establish a National Fund for Research and Innovation is currently being discussed in Cameroon). Burkina Faso, Côte d'Ivoire and Senegal, however,

do have dedicated funding agencies. In the case of Côte d'Ivoire and Senegal, funding systems promoting agricultural research have recently been established.

As Appendix Table A8.3 shows, the creation of SGCs and competitive research funds is of a rather recent origin in sub-Saharan Africa. Over the past decade, however, we have seen an increase in either the establishment of dedicated SGCs or agencies, or the promulgation of policies which stipulate that such agencies must be established in the foreseeable future. All of this points to a general and emerging consensus as to the necessity of having such councils as part of the national science system.

Separation of funding for research and innovation

A second emerging trend is the separation of funding councils for research and innovation. This trend, which is well established in many European countries and other modern science systems, is evident in a few countries in our study. Examples of this trend are found in South Africa (with the different mandates of the National Research Foundation and the Technology Innovation Agency); Kenya (National Research Fund and the Kenya National Innovation Agency); Botswana (with a separate National Innovation Fund); and Zimbabwe (with the Research Council of Zimbabwe and the Research and Development Commercialisation and Innovation Fund). Even where funding for basic research and innovation are not separated into two different funding agencies, there is clear evidence that countries in sub-Saharan Africa appreciate the importance of separating funding for research and innovation. So, for example, countries such as Cameroon and Nigeria have proposed a national research *and* innovation fund.

Different configurations of science funding agencies

Arguably, one of the main findings of our study relates to the wide range and diversity of science funding configurations in the selected countries. Using the widely accepted principal-agent framework, a number of questions presented themselves. For instance, what is the role of a principal of a fund (where a principal refers to either a ministry or STI funding council)? Does the principal only provide technical supervision or also financial supervision? Which mechanisms/structures are available to the principal to ensure that the fund is implemented according to certain guidelines (e.g. national development goals)? Moreover, in the case of STI funding councils acting as agent of a ministry (principal), it could be asked to what extent they are only conduits to channel funds and how much decision-making power they really have; for example, do they manage the funds apart from (partially or fully) administering the funds?

The following serve as examples of how these questions are addressed quite differently in different countries:

- In Ghana, the Council for Scientific and Industrial Research (CSIR) coordinates and administers the operations of the Science and Technology Research Endowment Fund

(STREFund). The STREFund is an independent funding mechanism. One mechanism by which the Ministry of Environment, Science and Technology (principal) ensures that the CSIR (agent) is serving the interests of government in its administration of the fund is through co-representation. The STREFund is governed by a board of trustees of nine persons representing the CSIR, the Association of Ghana Industries, the Ministry of Finance and Economic Planning, universities, the National Council for Tertiary Education, the Ghana Academy of Arts and Sciences, and the Ghana Atomic Energy Commission. At the same time, it could be argued that the representative board is also a mechanism by which the fund itself (as a second layer of agent) satisfies the interests of the CSIR as its immediate principal.

- A similar scenario could be observed in the case of Tanzania. The Tanzania Commission for Science and Technology (COSTECH) (the agent) is a government institution under the Ministry of Communication, Science and Technology (the principal). The National Fund for the Advancement of Science and Technology is located within the structure of COSTECH. The fund is an inter-ministerial fund channelled by the Treasury through the Ministry of Communication, Science and Technology. The fund is administered by an inter-ministerial and multi-sectoral committee, which comprises representatives of the relevant ministries (President's Office, Treasury, Planning Commission, Communication, Science), the Bank of Tanzania, the National University, the Chamber of Commerce, Agriculture and Industry, and the Director General of COSTECH. Thus, through representation on the committee, government, as principal, can ensure that COSTECH, as primary agent, is executing the fund in a manner that meets the national interest.
- In the case of Zambia, the National Science and Technology Council (NSTC) (agent) administers the Strategic Research Fund on behalf of the Department of Science and Technology in the Ministry of Education, Science, Vocational Training and Early Education (the principal). The mechanism by which the Ministry ensures that the NSTC serves the national interest in the administration of the fund is through dual fund management. The Strategic Research Fund is managed by two committees: the Technical Committee of the NSTC and the Fund Management Committee of the Ministry.

Functions of research funding agencies

Studies about the functions of science funding agencies typically identify three areas: selection, policy and control. We elaborate on each before discussing the empirical findings of our study.

In the *selection arena*, funding projects are selected either by anonymous scientific referees, mail review or by scientific peer-review groups. Administrators are considered to be brokers within these review groups. For refereeing, criteria are supplied by the funding

agency, and there is some selection of the 'right' referees by staff of the agency. After refereeing, the proposals, review reports and other documents are put together and ranked, and authoritative decisions eventually lead to the allocation of funds. To put it briefly: 'the business of a funding agency is: proposals in, money out' (Rip 2000: 469). It is important to discuss the peer-review process as it is vital to our understanding of the decisions and processes in the selection arena.

The majority of projects selected by initial peer review are typically transferred to more encompassing scientific boards, which check for compliance with the general mission of the funding agency. While initial peer-review groups do control for scientific quality and, if need be, for pick-a-back criteria, scientific boards take account of the relevance of research projects – either for the scientific community or for external communities. Even during the check there can be no doubt that scientific quality remains the main criterion for the selection of projects; only rarely will one find projects that have been funded because they fulfil the programmatic criterion while the scientific quality was not certified (Braun 1998: 814).

There are two dominant procedures that have been chosen as peer-review procedures in funding agencies, with somewhat different implications for the selection process: the anonymous mail review by individual referees (e.g. by the Deutsche Forschungsgemeinschaft in Germany and the National Science Foundation in the United States); and the peer-review group, which is the predominant form found in funding agencies. Some granting councils (e.g. the International Foundation for Science) are using both procedures simultaneously, which is particularly useful in the case of disagreement within the peer-review group. As has already been pointed out, the legitimate norms of distributing funding resources are at this stage clearly inspired by the promotion of scientific quality. There are no differences in this respect between funding agencies. This means that funding administrators do not interfere in order to claim the application of relevance norms at this stage. Thus, only the specific interests and positions of scientific referees matter with regard to the outcome of the distribution game. Criteria used in the reviews include, for example, the quality of the research design and the theories chosen; the consideration of former research; the originality of the research; its significance for the advancement of knowledge; and the qualification of the applicant (ibid.: 815).

Evaluation is also used to decide funding, following performance assessments of researchers, projects, programmes, departments and institutions. The assumption is that funds that are allocated after performance is evaluated will yield greater returns (Geuna & Martin 2003: 278). In the United Kingdom, this is the responsibility of the Higher Education Funding Councils, while in the Netherlands, evaluations are carried out by the Association of Netherlands Universities: the former use evaluation as a method of allocating funds, while the latter uses evaluation as a management tool. Different agencies also employ different criteria. They tend to focus on four typical output measures: volume, quality, impact and utility. Peer review and bibliometric measures are their main methods. In peer review, the unit of assessment is normally the 'project' or the 'individual'. However, because bibliometric analyses cannot usefully be applied across the board to all departments in a large number of universities, peer review has become the principal

method of university assessment as well. When supplemented by publication and citation data and other information, this method is called 'informed peer review' (ibid.: 279).

Peer review's main virtue lies in the assumption that it is ostensibly meritocratic – rewarding success and improving quality. A performance-based system can increase efficiency in the short term while also providing greater accountability. It provides a mechanism to link research to policy, a way to shift priorities across fields, and a rational method for moving resources from less well-performing areas to areas where they can be used to greater effect. While these arguments have their merits, a performance-based system also has its drawbacks. Firstly, obtaining reliable and comparable information is costly. Assessments based on peer review are especially labour-intensive, when all a nation's universities and their constituent departments have to be judged. Nor do indicator-based approaches offer a shortcut; if conclusions are to be robust, data must be accurate and reliable. Secondly, a performance-based funding system, because it encourages competition, may also encourage a shift towards the 'homogenisation' of research, discouraging experiments with new approaches and rewarding 'safe' research, irrespective of its benefits to society. The resulting decrease in diversity may be harmful. Moreover, a system that has publication as a key criterion encourages 'publication inflation'. Some academics will almost certainly respond by 'game-playing' without necessarily improving performance. Thirdly, performance-based funding can widen the gap between research and teaching; if rewards for research are greater than rewards for teaching, academics will focus on the former at the expense of the latter (ibid.: 296).

The term *policy arena* indicates that it is the function of these boards to define the 'intermediate goals' as well as the strategies to realise them by taking into account the 'constitutional' mission of the funding agency. In the policy arena we find scientific boards responsible for the second step review and, occasionally, additional boards (Braun 1998: 815). It is within the policy arena that goal conflicts occur. Tension between basic versus applied research is a fundamental stressor that results from a convergence between academic and mission-orientated funding sources. It is also in the policy arena that we find tension between steering and aggregation (Gulbransen 2005), as will be discussed in the following section.

In the *control arena*, the majority of publicly financed funding agencies have established a political board, which functions as an interface between the funding agencies and their environment – most notably the grant-givers from the political system. Political representatives sit on the boards of the financing agencies while the research management – who are supported by scientists – defend research policy and budget decisions. It is especially in this arena where political actors may interfere with policy or funding decisions.

In summary, the literature argues that funding agencies are tasked with quality control, allocation decisions and (developing/implementing) research policy. As intermediary public agencies, they receive public funds and seek to add value to these funds by selective distribution for high-quality research. All such agencies are concerned with control for quality. All are national agencies, with national missions, albeit defined in very different ways (Caswill 2004: 8). Caswill (2005) argues that there are a eight core tasks of funding agencies

that support a large variety of research council organisations and processes in the context of different sciences and national cultures. According to Caswill (ibid.), these are context-free components of the late 20th and early 21st century modern research council, which we can label as 'core essential' tasks. These include providing resources for research, maximising organisational resources, input of ideas, quality control, interconnection, national location, resource allocation, and delegation.

Our study has found that SGCs in sub-Saharan Africa perform a much wider range of functions than those identified in the literature. In fact, many of the functions that they perform are not even directly related to science funding per se. We summarise the functions performed by the science councils/funds/commissions identified in the 17 selected countries below. These functions are not derived from a strong notion of a well-functioning SGC (as found in the literature or even from studies elsewhere), but rather derived (inductively) from the actual activities in which SGCs in sub-Saharan Africa are engaged.

We have identified 12 areas in which SGCs typically operate. The first three can be regarded as different forms of science funding support and, therefore, speak to the core mission of a funding agency. But functions such as the dissemination of research findings, support for scientific publishing, and the collection of R&D data and statistics, are new functions that were also found to be performed by many of the SGCs in the selected countries. The 12 identified areas in which the SGCs were operating include the following:

1. Disbursement of research grants (various categories);
2. Disbursements of scholarships and loans (mostly masters and doctoral students);
3. Funding support for infrastructure development;
4. Valorisation of results (dissemination and uptake of research reports and findings);
5. Supporting scientific publishing/scientific journals;
6. Advocacy for STI;
7. Collection of data and statistics on S&T and R&D;
8. Capacity-building/training of researchers;
9. Policy advice;
10. Setting research agendas/research priorities;
11. Management of scientific collaborations and agreements; and
12. Coordination of the national innovation system.

Disbursement of research grants (various categories)

An important difference in the way in which different SGCs disburse funds to the scientific community has emerged from our study. Some councils function as research *granting* agencies in the true sense of the word (i.e. inviting applications, managing a peer-review process and then subsequently awarding funds on the basis of merit and other relevant criteria). Many of the

funding councils included in this study disburse research grants in this way.[2] For example, the Research Council of Zimbabwe (RCZ) funds research in all fields according to a set of national priority areas; the same applies to the National Research Foundation (NRF) in South Africa.

But in many countries, research is commissioned rather than supported through research grants.[3] Research conducted by inter-institutional and multidisciplinary teams and including short-term training is particularly encouraged. Each research team must have at least three partners with the possibility of an associate at regional or international research organisations operating in the national territory.

Disbursements of scholarships and loans (mostly masters and doctoral students)

Supporting postgraduate students (honours, masters and doctoral students) is one of the traditional functions of SGCs. The study found that this is the case in the majority of countries investigated. However, it was surprising to note that this is not the case in all countries. In countries such as Botswana, Ghana, Ethiopia, Kenya, Uganda and Zambia such scholarships are not available through the national granting councils. It is possible that another institution (such as a ministry of higher education) could perform this function in these countries. It is more likely, though, that international agencies provide the bulk of masters and doctoral scholarships in many of these countries because of the lack of such support from the local government. This is an area that requires further investigation.

Support for infrastructure development

We have found few examples where SGCs provide funding and support for scientific infrastructure and equipment. The NRF in South Africa is an exception. Another example is in Côte d'Ivoire where the Inter-professional Fund for Agricultural Research and Council (FIRCA) works with the agricultural sector by providing for the training of producers and supporting sector-based organisations' structures. This involves developing process manuals and development plans, and assisting in the consolidation of the associations. FIRCA also supports associations by funding the following:

- Generating technologies to meet the needs of producers;
- Transferring and diffusing technology in the medium-term;
- Increasing production;
- Improving the productivity of farms;
- Putting quality products on the market; and

2 Grants are non-repayable funds disbursed by one party (grant-makers) (often a government department, corporation, foundation or trust) to a recipient (often, but not always, a non-profit entity, educational institution, business or individual).

3 Commissioned research is research requested by an external party in exchange for payment.

- Training and building the capacity of farmers and their organisations for greater professionalism.

Valorisation of results (dissemination and uptake of research reports and findings)

SGCs are increasingly getting involved in adding value to research findings and outcomes that they fund. The international trend towards issues related to maximising research uptake and impact is also evident in Africa, although on a much smaller scale. Some examples were found in Burkina Faso where the National Fund for Research and Innovation for Development (FONRID) participates in the uptake of research results and technological innovations, by funding result-focused or uptake activities. COSTECH is mandated to take the lead in gathering and disseminating research results in Tanzania, and in Zambia, the NSTC is responsible for collecting and disseminating S&T information, including publication of scientific reports, journals and other such documents and literature.

Supporting scientific publishing/scientific journals

Related to the valorisation of results is an interest in supporting scientific publishing in a country. In South Africa this function is not performed by the NRF but by the Academy of Science of South Africa (with generous support from the Department of Science Technology). In Ethiopia, in the past, the Ethiopian Science and Technology Agency (ESTA) benefitted from a generous grant from the Swedish International Development Cooperation Agency that supported the publication of national science journals. In Burkina Faso, FONRID also funds quality scientific and technical publications as part of research projects, and the RCZ in Zimbabwe supports the publication of six national journals: the *Central African Journal of Medicine*, *Journal of Applied Sciences in Southern Africa*, *Journal of Science and Technology*, *Zimbabwe Science News*, *Zimbabwe Veterinary Journal,* and *Zambezia Journal of Humanities*. Given the precarious state of scientific journals on the African continent and the general lack of visibility of African science in international databases and indexes, this is clearly an area where SGCs could play a bigger role.

Advocacy for STI

In Ghana, the proposed National Research Funding Council will be responsible for providing STI advocacy, so that the voice of the country's STI community will be represented in the country's programmes and policies at all levels. The NCST in Kenya conducted various activities aimed at creating awareness relating to STI in Kenya. An example of this is the training, conducted in 2012, of public relations and communications officers on biosafety. The intention of this training was to create a critical mass of communicators. They can then provide factual information on biosafety issues to both policy-makers and to the public. A further

example is the participation of NCST staff in the Strategic Trade Control and Security training of 2012, attended by 52 participants from 13 countries. In 2012, the NCST also participated in activities such as the micro and small enterprise innovation and technology exhibition and symposium. This event was sponsored by the NCST and aimed to create a forum to bring together innovators, research institutions, technology providers and the general public. Other examples include the 2012 and 2013 participation of the NCST/NACOSTI in the Agricultural Society of Kenya show in Mombasa and in the Nairobi International Trade Fair.

Collection of data and statistics on S&T and R&D

It is imperative that reliable and regular statistical information on R&D in a country is produced. There are very different national models of how and where this function is performed. For example, in Canada, the R&D statistics are gathered and analysed by StatsCanada; in the United States, the National Science Foundation produces such data on a regular basis. In South Africa, a unit within the Human Sciences Research Council (the Centre for Science, Technology and Innovation Indicators) performs this function, although it used to be housed in the precursor to the NRF. Our research showed that the collection and analysis of R&D statistics is housed in a few SGCs. The Uganda National Council for Science and Technology (UNCST) is one of the few organisations that collect and analyse scientific and technological statistics and indicators to facilitate measurement and provide advice to government. The NCST regularly evaluates sector performance using conventional and standardised STI indicators, and publishes these in the annual STI status reports.

Capacity-building/training of researchers

Given the lack of research culture in the Francophone countries, many of the SGCs studied in West Africa are concerned with training of researchers, particularly with regards to proposal writing and technical support. FONRID in Burkina Faso offers support to public and private research and technological innovations, laboratory equipment or workshops as part of specific programmes of research and development approved by the Fund.

Policy advice

The literature shows that some SGCs do in fact play a role in advising government on science and innovation policy. It is important to emphasise that this does not usually involve the development of policy, but more typically advising on policy (and in some cases evaluating policy). In Rwanda, the NCST is currently operational with the mandate of providing informed policy recommendations to the government and advice on human capacity-building strategies, in order to ensure that Rwanda is equipped with a critical mass of highly qualified skills in S&T to support the achievement of a competitive and sustainable socio-economic

development based on STI. The RCZ in Zimbabwe is also mandated to advise the government on matters of research. COSTECH in Tanzania is the principal advisor to the government on matters pertaining to S&T and its relevance to the socio-economic development of the country. In Uganda, the UNCST is responsible for preparing policy notes to inform policy-makers, scientists and the public on matters related to technology forecasting, assessment and transfer. In Zambia, the NSTC is mandated to regulate research in S&T; register institutes and centres; and advise the government on S&T policies and activities in the country.

Setting research agenda/research priorities

Because of their strategic position within national science systems, SGCs typically advise government on national research priorities and new initiatives. This advice is often grounded in research projects funded and feedback from peer-review process, as well as on the basis of regular reviews of scientific fields and disciplines. The NRF in South Africa is a good example where this is regularly done. Over the past ten years it has commissioned various studies that reviewed its funding instruments, as well as evaluations of specific fields (such as mathematics and physics). The fact that the NRF also houses a directorate on 'new knowledge fields' is another indication of the role that it performs in co-constructing the national research agenda. Other examples from our study include the National Research and Innovation Council (NRIC) in Nigeria, which is mandated to set national priorities on R&D and to set direction to coordinate STI activities, including R&D, in line with national priorities; and the Zambian NSTC, which identifies and determines national R&D priorities in S&T.

Management of scientific collaborations and agreements

Various bodies in the national science system are typically involved in the management of international agreements and collaborative networks. It is uncommon to find that national academies of science perform this role. In many countries this function is performed by the ministry or national department of science and technology and, as we found, also by national granting councils. In South Africa, the NRF has traditionally played a central role in managing bilateral and multilateral science agreements. More recently, it has increased its involvement in this arena by appointing 'national contact persons' to mediate between the South African scientific community and the European Union (and its various frameworks and funding instruments).

Other examples of SGCs which perform a similar function were found in our study. FONRID in Burkina Faso is responsible for, amongst others, the mediation between national partners, bilateral or multilateral structures and public or private research structures in the negotiation, development and implementation of projects or research programmes. In Uganda, the UNCST is responsible for developing partnerships and networks among different stakeholders through the creation of technical working groups to steer and oversee particular

National Science, Technology and Innovation Plan programmes and projects. The NSTC in Zambia is responsible for establishing and maintaining a relationship with corresponding scientific organisations in other countries.

Coordination of the national innovation system

Finally, many of the country analyses revealed a weak or fragmented national innovation system. There has been an effort to rectify this constraint with the proposal of many new councils/funds/commissions. An example is the National Research Funding Council in Ghana, which will be responsible for ensuring coordination and harmonisation of the country's STI policies, so that STI activities are comprehensive, complementary and reinforcing across all sectors and ministries.

Concluding comments

SGCs (and equivalent bodies) in sub-Saharan Africa are at different stages of development. Some councils (e.g. in South Africa, Tanzania, Kenya and Zimbabwe) are well established, whereas others (as in Namibia, Botswana and Mozambique) are in their early stages of establishment. Francophone countries (such as Burkina Faso, Senegal and Cameroon) have very different institutional arrangements, where competitive funding and the associated practices are of a more recent origin and less well-established. In many of the countries included in the study, the national landscape is characterised by a multitude of funding agencies, programmes and instruments often organised around sectoral interests (e.g. health and agriculture). In addition, these councils face a variety of challenges (e.g. resource constraints, governance issues, lack of clarity on institutional differentiation, lack of coordination within science systems, marginalisation of influence, and so on). There is little evidence of sharing of expertise and experience amongst SGCs – often within the same country, but definitely within regions and across the continent.

The differentiated landscape of research funding models found in this study is not only the result of different histories in science policy development and different trajectories in the institutionalisation of a science ministry in the respective countries, but also reflects different science governance models. As we have seen, these governance models are related to the historical roots of these systems in the British and French models of science management. However, we have also seen that more recent trends, which include the notion of 'national systems of innovation', are reflected in the separation of funding (basic) research and innovation.

The relatively poor investment in R&D in many sub-Saharan Africa countries, which has a direct impact on the science funding models, points to different 'inscriptions' of science in different countries as well as different values afforded to science. On the one hand, some governments clearly recognise the value and importance of science and hence invest in science funding and the establishment of a national funding agency. On the other hand, many governments have not – at least until very recently – judged science to be of sufficient value

and importance to invest in the establishment of a relatively autonomous agency to disburse state funds for R&D. Having said this, the fact that there has been a surge of interest in the recent past in reformulating existing science policies, as well as the establishment of a separate ministry of science, may be indicative of a change, even amongst the latter categories of countries.

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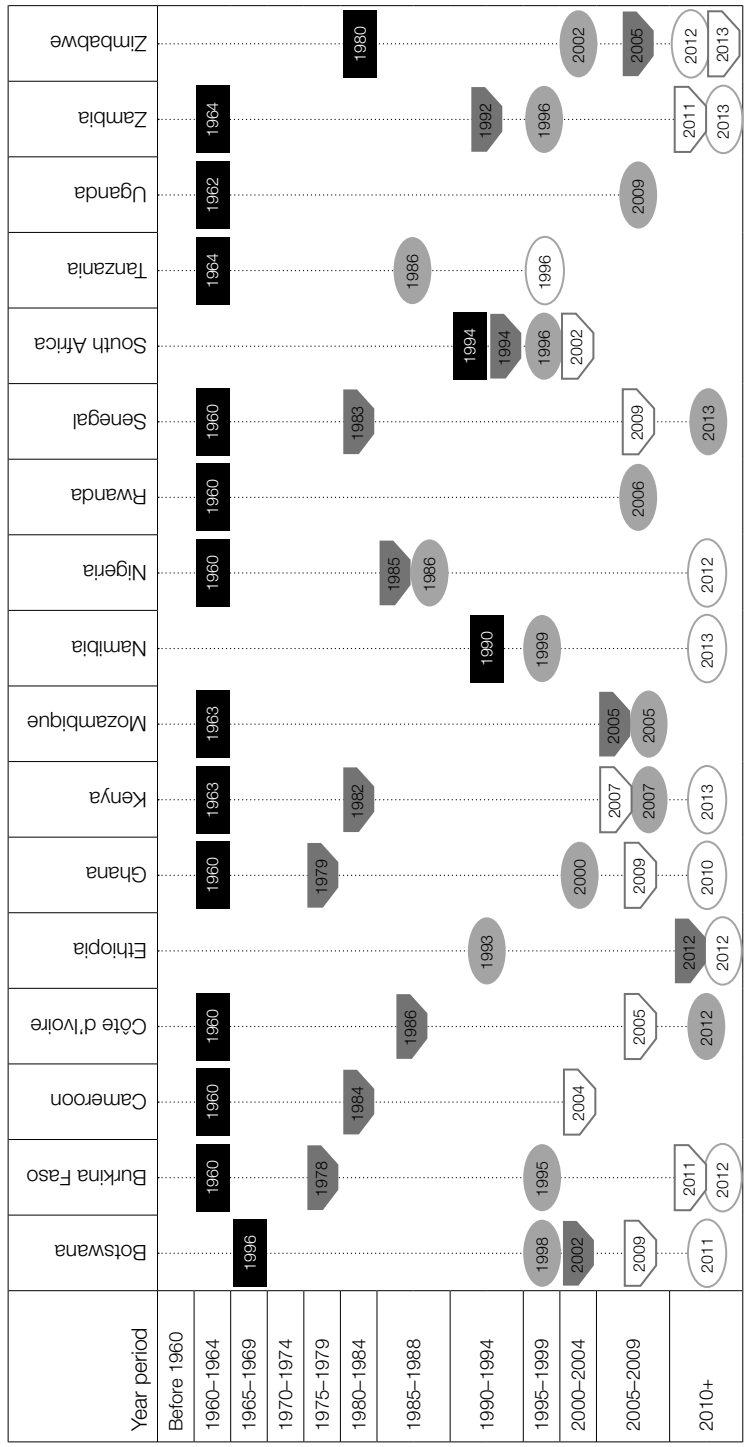
Appendix tables

Table A8.1 Selected 'milestones' in science and technology governance and policy-making, by country



Note: The 'milestones' are displayed chronologically using the legend below:

Table A8.2 Funding bodies in the 17 selected countries

Country	Ministries/departments	Funding councils/intermediaries	Funds/funding instruments
BOTSWANA (Current)	Department of Research, Science and Technology in the Ministry of Infrastructure, Science and Technology directly funds R&D		
	Ministry of Education and Skills Development	Tertiary Education Council	Sectoral Research Funds (competitive) under the Tertiary Education Council Funding Model for Botswana
	National Commission for Science and Technology		Training of Scientists and Technologists Fund
BOTSWANA (Supposed to be operational by now but evidence is lacking)	Department of Research, Science and Technology in the Ministry of Infrastructure, Science and Technology	Botswana Research, Science and Technology Funding Agency	
		Botswana Innovation Hub	Innovation Fund
BOTSWANA (Proposed)	Department of Research, Science and Technology, to become a Directorate in the Botswana National Research, Development and Innovation Coordinating Council		National Research Fund
BURKINA FASO	Ministry of Scientific Research and Innovation	National Fund for Research and Innovation for Development (*Le Fonds National de la Recherche et de l'Innovation pour le Développement*)	
	Ministry of Secondary and Higher Education	National Fund for Education and Research (*Le Fonds National pour l'Education et la Recherche*)	
	Research Health Directorate of the Ministry of Health		Fund for the Support of Health Research (*Fonds d'Appui à la Recherche en Santé*)

Country	Ministries/departments	Funding councils/intermediaries	Funds/funding instruments
CAMEROON (Current)	Ministry of Scientific Research and Innovation		Competitive Research Fund (*Fonds de Recherche sur Base Competitive au Cameroun*) (for agricultural research)
	Ministry of Higher Education, Support to Education System Programme (*Programme d'Appui au Système de l'Enseignement*)		Fund for Support to Research and Professionalisation (*Fonds d'Appui à la Recherche et à la Professionalisation*)
			Fund for the Development of Cocoa and Coffee Sectors (*Fonds de Développement des filières Cacao et Café*)
			Competitive fund to reward researchers, including for Scientific Research and Innovation Excellence Week (*Journées de l'Excellence de la Recherche Scientifique et de l'Innovation au Cameroun*)
			Fund to Support Research, the University Fund for Dissemination of Scientific and Technical Information
CAMEROON (Proposed)	Ministry of Scientific Research and Innovation		National Fund for Research and Innovation (*Fonds National de la Recherche et de l'Innovation*)
CÔTE D'IVOIRE	Ministry of Higher Education and Scientific Research	Strategic Support for Scientific Research Programme in Côte d'Ivoire (*Programme d'Appui Stratégique à la Recherche Scientifique*)	
	Ministry of Agriculture	Interprofessional Fund for Agricultural Research and Council *(Fonds Interprofessional pour La Recherche et le Conseil Agricoles*)	
CÔTE D'IVOIRE (Proposed)	Ministry of Higher Education and Scientific Research	National Fund for Scientific and Technological Research (*Fonds National de la Recherche Scientifique et Technologique*)	
ETHIOPIA (Current)	Ministry of Science and Technology		Local Research and Development Grant
ETHIOPIA (Proposed)	Ministry of Science, Technology and Innovation	National Science, Technology and Innovation Council	
GHANA (Current)	Ministry of Environment, Science and Technology	Council for Scientific and Industrial Research	Science and Technology Research Endowment Fund
	Ministry of Education		Ghana Education Trust Fund
GHANA (Proposed)		National Research Funding Council (apex body)	
KENYA (Current)	Department of Science and Technology in the Ministry of Education, Science and Technology	National Council for Science and Technology	Science, Technology and Innovation Fund

Country	Ministries/departments	Funding councils/intermediaries	Funds/funding instruments
KENYA (Proposed)	Department of Science and Technology in the Ministry of Education, Science and Technology	National Commission for Science, Technology and Innovation	National Research Fund
			Kenya National Innovation Agency
MOZAMBIQUE (Current)	Ministry of Science and Technology		Fund for Poverty Research (*Fundo de Investigação sobre Pobreza*)
MOZAMBIQUE (Proposed)	Ministry of Science and Technology		National Research Fund
NAMIBIA (Current)	Line ministries fund research, researchers and research institutes operating with the ministries		
NAMIBIA (Proposed)	Ministry of Higher Education	National Commission for Research, Science and Technology	National Research Fund
		Council for Research and Innovation	
NIGERIA (Current)	Research funding by the various ministries (i.e. Federal Ministries of Health, Agriculture, and Environment)		
			Tertiary Education Trust Fund
NIGERIA (Proposed)	Ministry of Science and Technology		National Research and Innovation Fund
		National Research and Innovation Council	
		State Science, Technology and Innovation Council	
		National Council on Science, Technology and Innovation	
			Education Trust Fund Research Fund
RWANDA (Current)	Directorate of Science, Technology and Research in the Ministry of Education directly funds research in the country		
	Ministry of Education		Rwanda Research Innovation Endowment Fund
RWANDA (Proposed)	Directorate of Science, Technology and Research in the Ministry of Education directly funds research in the country	National Commission for Science, Technology and Innovation	National Research Fund
SENEGAL (Current)	Ministry of Higher Education and Research	Fund to promote Scientific and Technical Research (*Fonds d'Impulsion de la Recherche Scientifique et Technique*)	
	Ministry in charge of Agriculture	National Fund for Agriculture and Agrifood Research (*Fonds National de Recherches Agricoles et Agro-Alimentaires*)	

Country	Ministries/departments	Funding councils/intermediaries	Funds/funding instruments
SENEGAL (Proposed)	Ministry of Higher Education and Research	National Fund for Research and Innovation	
SOUTH AFRICA	Department of Science and Technology	National Research Foundation	Various funding instruments
		Technology Innovation Agency	Four funding instruments
	Department of Health	Medical Research Council	Various funding instruments
	Department of Water and Environmental Affairs	Water Research Commission	Two funding instruments
TANZANIA (Current)	Ministry of Communication, Science and Technology	Tanzania Commission for Science and Technology	National Fund for the Advancement of Science and Technology
TANZANIA (Proposed)		Tanzania Commission for Science and Technology	National Research Fund (to replace NFAST)
UGANDA	Treasury		Presidential Science Initiative
	Ministry of Finance Planning and Economic Development	Uganda National Council for Science and Technology	Science, Technology and Innovation Fund
			National Innovation Fund
ZAMBIA (Current)	Department of Science and Technology in the Ministry of Education, Science, Vocational Training and Early Education	National Science and Technology Council	Two funding instruments (Strategic Research Fund and Science and Technology Innovation Youth Fund)
		National Technology Business Centre	National Technology Business Fund
ZAMBIA (Proposed)	Department of Science and Technology in the Ministry of Education, Science, Vocational Training and Early Education	National Research Council	None, as it will not be a funding agency
			National Research and Innovation Fund
		National Technology Innovation Agency	Unknown
ZIMBABWE	Ministry of Higher and Tertiary Education, Science and Technology Development	Research Council of Zimbabwe	Two funding instruments (small research grants for masters and doctoral students and large research grants open to all)
			Research and Development Commercialisation and Innovation Fund

Table A8.3 The rise of science granting councils and competitive research funds in sub-Saharan Africa

Countries	Research councils/foundations	Year of creation
Botswana	NRF	To be established
	NCST	2002
	Innovation Fund	To be established
	BRSTFA	To be established
	TEC	1999
	BIH	2013
	BNRDCC	To be established
Burkina Faso	*FONRID*	2011
	FONER	1994
	FARES	2008
Cameroon	FRBC	2009
	FARP	2009
	FNRI	To be established
Côte d'Ivoire	*PASRES*	2007
	FIRCA	2002
	FNRST	To be established
Ethiopia	*NSTIC*	To be established
Ghana	*CSIR*	1969
	STREFUND	2008
	GETFUND	2000
	NRFC	To be established
Kenya	NRF	2013
	KENIA	2013
	NCST	1977 (replaced with NACOSTI)
	NACOSTI	2013
Mozambique	NRF	2009
Namibia	NRF	To be established
	NCRST	2013
	CRI	To be established
Nigeria	TETFUND	2011
	NRIF	To be established
	NRIC	To be established
	SSTIC	To be established
	NCSTI	To be established
	ETF	2009
Rwanda	NRF	To be established
	RIEF	2012
	NCSTI	2013

Countries	Research councils/foundations	Year of creation
Senegal	*FIRST*	1973 or 2007
	FNRAA	2008
	FNRI	To be established
South Africa	*NRF*	1918 (Research Grants Board)
	MRC	1969
	WRC	1971
	TIA	2008
Tanzania	*COSTECH*	1988
	NFAST	1995
	NRF	To be established
Uganda	NIF	2002
	STIF	2009
	UNCST	2009
Zambia	*NRC*	To be established
	NTBC	2001
	NSTC	1999
	SRF	2007
	NTBF	2011
	NTIA	To be established
	NRIF	To be established
	STIYF	2007
Zimbabwe	*RCZ*	1986
	RDCIF	2004/2005

Notes:
1. Cameroon has no national competitive research fund; FONER – despite its name – can hardly be considered as a competitive research fund
2. Acronyms indicated in *italics* can be described as funding councils/intermediaries

CHAPTER 9

THE ROLES OF NATIONAL COUNCILS AND COMMISSIONS IN AFRICAN HIGHER EDUCATION SYSTEM GOVERNANCE

Tracy Bailey

Tertiary/higher education governance and the rise of councils and commissions

A review of the international literature on higher education governance reveals that much of the focus of research and publication over the past few decades has been on governance at the institutional level (how institutions are organised and operate internally) and on the relationship between the state and universities (see, for example, Amaral et al. 2002; Bjarnason & Lund 1999; Neave & Van Vught 1991, 1994; Van Vught 1989). There has been relatively little focus on governance at the system level and, within this, the role of semi-autonomous government agencies – although in recent years, research on the role of such agencies has begun to emerge internationally and in the African context.[1]

Broadly speaking, tertiary or higher education (TE/HE)[2] governance at the system level refers to the institutional arrangements (frameworks, structures, resources, processes and activities) that are involved in the direction, planning, management and coordination of TE/HE institutions and the sector as a whole. Governance also relates to all those involved

1 For examples of research in this area in sub-Saharan Africa, see Lebotse (2014), Materu (2007), Mouton et al. (2014) and Saint et al. (2009).

2 Since the eight councils/commissions in this study service either their tertiary education (all post-secondary) or higher education (typically universities and polytechnics or similar) sectors, depending on their mandates, the abbreviation TE/HE is used when making general reference to this governance domain.

in policy-/decision-making and implementation and includes the state, institutions and, increasingly, other external stakeholders.

A core component of system governance is 'steering' – that is, the use of various mechanisms to move the sector and institutions in the direction of particular TE/HE (and national development) goals. Such goals might relate to increasing equity and access and the massification of the sector; the development of priority skills/competencies for the labour market; the attainment of certain standards of quality; differentiation in the institutional landscape or academic offerings; and increasing productivity in research, science, technology and innovation in identified priority areas. Typical steering mechanisms include funding allocations (in the case of public institutions); regulation (institutional and programme accreditation); quality assurance requirements (units within institutions and institutional/quality audits); institutional strategic planning; and financial and performance reporting requirements. Furthermore, steering involves a number of governance functions including:

- The development and maintenance of a pact (agreement) between key stakeholders about the role(s) of and vision for TE/HE;
- Policy development (national plan) and strategic planning for the sector (and hence the institutions);
- The development of regulatory frameworks (norms and standards) relating to staff qualifications, infrastructure and facilities etc.;
- Setting targets for various aspects of the sector (e.g. enrolment numbers and profiles, throughput and success rates, programme spreads, academic staff qualifications, research outputs and internationalisation); and
- Coordination of knowledge policies and activities within the broader system and of relationships between key stakeholders, as well as oversight of the governance system as a whole.

System-level governance and steering takes place within the context of the particular form of state-institution relationship, which is structured primarily around the prevailing norms on academic freedom, institutional autonomy and accountability. In this regard, Neave and Van Vught (1994) refer to 'state control' versus 'state supervision' in higher education. The authors describe the state control model, traditionally found in European higher education systems (and thus also referred to as the 'continental model'), as follows (ibid.: 9):

> *These systems are created by the state and almost completely financed by it. The state very often also is the overarching and highly powerful regulator of the system. … In the continental model the overwhelming power of the state is combined with a strong authority at the level of the senior chaired professors, who hold considerable power at the lower level of the system.*

The state supervision model, usually associated with the higher education systems in the United States and Britain, is characterised by limited government influence and much greater autonomy and powers by the faculty guilds and trustees and administrators (vice-chancellors) at the institutional level with regard to such matters as admission policies, curricula and the hiring of faculty (ibid.: 10). The supervisory model has also been linked to the rise of the so-called 'evaluative state' which focuses on the external evaluation of quality in higher education (Maassen 1995; Neave 1988).

In Europe and other developed countries, the trend towards greater institutional autonomy, and with it increased public accountability, has seen a move away from state control and academic collegial governance towards the supervisory model. Muller et al. (2006: 301) describe the rationale for this shift as follows:

> *The implicit assumption in the state control and state supervision models was that a development from state control to state supervision should be promoted because if the state had a supervisory role it would lead to the better performance of higher education than if it had a controlling role. From this perspective, state steering in the form of state supervision was the preferred alternative to the by now widely discredited, traditional, 'top-down' form of co-ordination.*

The supervisory model nowadays is characterised by 'multi-level multi-actor' governance that includes the redistribution of decision-making powers, responsibilities and accountability among external and internal stakeholders (De Boer & File 2009: 9-10; Eurydice 2008: 25; Huisman 2013). As such, system-level governance typically includes the following bodies (Eurydice 2008: 26):

- A parent ministry (and its relevant department or unit) with overall responsibility for policy-making, strategic planning and ensuring compliance;
- Semi-autonomous agencies responsible for distributing and monitoring public funds, external quality assurance and regulation (including setting norms and standards), and/or giving expert advice and monitoring/analysing trends to inform advice; and
- Informal national-level forums comprising TE/HE institutional leadership that can make proposals to the parent ministry regarding the development of the sector.

Many TE/HE systems in developing countries have adopted Western models of governance, largely via transference from colonial powers – the effect of which, according to Neave and Van Vught (1994: 11, 13), 'has been the predominance of the state control model in several developing nations, often leading to rather an authoritarian governmental attitude towards higher education institutions.' This has been the case in the African context. Following a workshop on 'Creating the African University' held in Accra in 1972, the Association of African Universities declared that 'the university in Africa occupies too critical a position of

importance to be left alone to determine its own priorities' and that it should therefore 'accept the hegemony of government' (Yesufu 1973: 45). This is echoed by Saint et al. (2009: 13) who observe that the 'history of African higher education has been characterized by strong government controls on institutions of higher learning' including 'constraints on institutional autonomy'; government interference, especially in one-party states and also in Francophone countries; and the relations between public universities and their governments characterised by 'conflict rather than partnership'. However, according to Moja et al. (1996: 130), the state control model in Africa was unworkable owing to weak bureaucracies that could not implement policy intentions:

> *The state control model of the Accra workshop was never properly translated from a policy ideal into a workable administrative procedure. Bureaucratic management structures were never put in place to 'steer' universities according to anything like a development plan. Indeed, the weakness of higher education bureaucracies in Africa has played a large role in the inefficiency and, all too often, corruption that has plagued so many of them. The result has been a ministry with clear political intentions but with a bureaucracy ill-equipped to manage them. It was almost inevitable then that the politicians would try to intervene directly in the universities to pursue their political aims, and that the universities would cry foul and resist any and every attempt at what they saw as illegitimate interference in their autonomy.*

Moja et al. (ibid.: 150) ascribe the weak bureaucracies in Africa to the 'ethos of anti-bureaucracy' amongst postcolonial intellectuals which, following independence, resulted in the absorption of intellectuals into politics, universities and the private sector rather than into the public sector: 'Consequently, most post-independence countries had a rather meagre talent pool to draw on to re-build the civil service … The result almost everywhere was a weak and unprofessionalised bureaucracy perpetually under attack from the articulate intellectuals in and out of government.'

In addition to the state control and state supervision models, various authors have highlighted a third form of interaction between the state and institutions, namely 'state intervention' or 'state interference'. Such political intervention or interference in the operations of TE/HE institutions has occurred when institutions were viewed as sites of contestation or opposition and political dissent (such as the student uprisings of the 1960s in Western Europe or the anti-apartheid activities in South African universities prior to 1994) (Court 1991: 330; Lulat 2003: 29; Moja et al. 1996: 148–149; Neave & Van Vught 1991: xi–xii). In the African context, as Moja et al. (1996: 146, 149) observe, 'the government never tried seriously to impose bureaucratic control; the control exerted was political, usually mobilised to contain ideological opposition to the state' and that 'state intervention occurs despite the fact that autonomy is the official policy.' Political intervention has also occurred as ad hoc state responses to crises of institutional governance (Du Toit 2014: 18). According to Du Toit

(ibid.: 16), while 'interference' is most often cast in terms of the (real or potential) violation of institutional autonomy, it is more constructively viewed as 'an insufficiently systemic practice of higher education governance at the level of state-sector relations, leading to ad hoc and arbitrary government interventions in having to deal directly with local crises of institutional governance.'

In both the European and African contexts, the establishment of statutory 'intermediary' or 'buffer' bodies (such as TE/HE councils or commissions) was seen as one way of preventing (the need for) such political interference (Du Toit 2014: 35; Neave & Van Vught 1994: pxii). The emergence of specialised, semi-autonomous government agencies was also related to broader public sector reforms widespread in developed countries since the 1980s (Caulfield et al. 2006: 1; Groenleer 2009: 15; Pollitt et al. 2001: 272, 275). Often referred to as the process of 'agencification', the creation of these bodies is usually linked to the rise of the so-called 'regulatory state'[3] and to the influence of 'new public management' or 'managerialism' at the system level (Braun 1999: 1; Gilardi 2005: 84-85; Gornitzka & Stensaker 2014: 2; Groenleer 2009: 17; Maassen 2003: 33). The literature suggests a number of motives for the establishment of agencies, including demands on governments for greater efficiency, responsiveness, transparency and accountability; decreased political interference in governance matters; and enhanced technical expertise and the specialisation of functions (Caulfield 2006: 1; Gornitzka & Stensaker 2014: 8; Groenleer 2009: 18; Pollitt et al. 2001: 277). Broadly speaking, the nature and function of government agencies are diverse but have been described as being at arm's length from their parent ministry; carrying out public tasks; having a core staff comprising public servants; being (largely) financed by the state budget; and being subject to at least some administrative law procedures (Pollitt et al. 2001: 274–275).

Reforms and the emergence of specialised, semi-autonomous government agencies have also occurred within the realm of TE/HE governance in Africa. The international nature of higher education means that developments in one part of the world often have an impact on higher education elsewhere. Certain trends within the African context also made these reforms necessary including, for example, the need for more effective management at the system level in response to increasing demand for TE/HE and the growing importance of TE/HE in national development (Fielden 2008: 2), as well as the rapid growth of these systems (massification), making them 'too large and too complex to be managed effectively from a central ministry' (Saint et al. 2009: 10). As such, the introduction of TE/HE councils and commissions in Africa can be seen as indicative of efforts to move from a state control to a state supervision model; in particular, the introduction of agencies with specialised functions and expertise, and a degree of autonomy and political independence, in order to improve efficiency and effectiveness within the governance system.

3 Broadly speaking, the 'regulatory state' is a term used to describe 'the growth of regulatory agencies to discharge a public interest on behalf of government in economic and social affairs' (King 2006: 2).

About the study

One of the analytical propositions of the Higher Education Research and Advocacy in Africa (HERANA) project is that for higher education to make a sustainable contribution to development in a country, there has to be national-level coordination of knowledge policies and of the key actors in the system. The study found that TE/HE councils/commissions had been established in each of the eight countries. More often than not, these agencies were mandated to undertake accreditation and advisory functions and had, over time, assumed additional roles and functions. It became apparent to the research team that these organisations could be key players in sector-level governance, particularly in terms of steering, coordination and implementation monitoring. In addition, as highlighted above, a review of the literature on higher education governance revealed that there was a paucity of research on governance at the system level and, in particular, on the role of councils/commissions in this regard.

In order to address this gap and to contribute to the body of empirical knowledge on the role and functions of TE/HE councils/commissions in general, and in the African context in particular, the *Higher Education Councils and Commissions in Africa* project was initiated in late 2011. The study focused on the councils and commissions that were in existence in the eight countries that formed part of HERANA Phase 1. These included:

- The Botswana Tertiary Education Council (B-TEC)[4]
- The Ghana National Council for Tertiary Education (G-NCTE)
- The Kenya Commission for Higher Education (K-CHE)[5]
- The Mauritius Tertiary Education Commission (M-TEC)
- The Mozambique National Council for Quality Assurance (M-CNAQ)
- The South African Council on Higher Education (SA-CHE)
- The Tanzania Commission for Universities (TCU), and
- The Uganda National Council for Higher Education (U-NCHE).

The key questions of the study were:

1. Why were the councils/commissions established? What were their basic characteristics in terms of legal frameworks, structures and resources?
2. What functions were the councils/commissions mandated by law to undertake? What functions were they undertaking in practice and which functions were not yet fully implemented? What roles in TE/HE governance (steering and coordination) were the councils/commissions playing via their functions?

4 This agency was reconstituted as the Human Resources Development Council in 2013.

5 This agency was reconstituted as the Kenya Commission for University Education in 2013.

3. Did the councils/commissions have the necessary capacity, data and leverage to fulfil their functions?
4. What broader systemic factors were impacting on their ability to fulfil their functions?

It was assumed that factors both internal and external to the organisation impact on its *raison d'être* and the way it functions and operates. Internal factors explored included the way in which the organisation was structured and composed, its legal status and powers, and the resources available to it to carry out its mandate. External factors included, amongst others, funding sources and arrangements, interaction with other actors in the system, and the agencies' legal and political autonomy in relation to external stakeholders.

The project began with the development of detailed case studies of the eight councils/commissions during 2012/2013. Desk research was undertaken in preparation for the site visits, which included information about each country's TE/HE system and the council/commission itself, as well as detailed overviews of the relevant legislation pertaining to the establishment, mandate and operation of these organisations. Policy documents, strategic plans, annual reports and other relevant publications, statistics and websites were also reviewed as part of the development of the case study reports. The site visits to each of the councils/commissions were undertaken by the project leader between March and October 2012, to conduct interviews with senior leadership and staff at each of the councils/commissions and with at least one key individual in the parent ministry.[6] These interviews explored the historical and broader political contexts within which the councils/commissions were created and operated, as well as the structure, composition and functions of these organisations.

The case study reports formed the basis of a synthesis report (Bailey 2014) that undertook a comparative analysis of the roles and functions of the councils/commissions. There were also two sub-components to the broader project, namely, a comparative analysis of the legislation that gave rise to and mandated the councils/commissions in the study (Chirwa 2014), and a comparative analysis of how the councils/commissions were financed, and how they carried out their funding functions (where applicable) (Mohadeb 2013).

The project was undertaken by a multidisciplinary research team with members from the participating countries, and working in collaboration with key resource people and key informants from the councils/commissions and ministries in the eight countries. The key resource people offered invaluable assistance in providing background information, negotiating with gatekeepers and scheduling interviews, responding to queries during report-writing, and attending work-in-progress seminars.

A limitation to the study was the primary focus on the perspectives and experiences of those internal to the councils/commissions concerned. It was beyond the financial and human resource capacity of the research team to extend the investigation to key external stakeholders

6 In total, interviews with 53 individuals were conducted.

which no doubt would have added valuable perspectives on the operations and functions of these agencies. However, as Pollitt et al. (2001: 288, original emphasis) observe, most of the current literature on TE/HE agencies 'is predominantly based on views from the outside – reports and other accounts by ministers, parliaments, external auditors, academics, and so on' and that, therefore, 'our knowledge of what goes on *inside* agencies is as yet fairly limited.'

It should be noted that this study was not an attempt to measure or evaluate the success, impact or effectiveness of the councils/commissions' operations or the fulfilment of their functions. To the extent that evaluative observations are made, these are based on the challenges or obstacles reported by interview respondents and in official documentation. It was also beyond the scope of this study to explore or develop a detailed picture of the overarching TE/HE governance system in each country in terms of which organisations were fulfilling which roles. However, in discussing the roles and functions of the councils/commissions and the key challenges they were facing in this regard, it was not possible to avoid making observations about the broader governance systems, as will be seen in the concluding sections of this chapter.

Creation and characteristics of the councils/commissions

There were various narratives relating to the developments, discussions and, in some cases, reviews and reports that led to the creation of the councils/commissions in this study. Most began with the (sometimes significant) expansion of the TE/HE sectors (public and/or private) since about the 1970s. Official documents and interview respondents described rapidly expanding and diversifying sectors, primarily as a result of market forces and trends locally and internationally, as well as internal or donor-driven policy initiatives to increase access and participation rates. These developments saw significant increases in student numbers. According to a UNESCO (2010: 1) report, for instance: 'While there were fewer than 200 000 tertiary students enrolled in the region in 1970, this number soared to over 4.5 million in 2008 – a more than 20-fold increase.' There has also been exponential growth in the number and range of institutional players – and particularly in the private sector – as enumerated by a World Bank report as follows (Yusuf et al. 2009: 48):

> *A significant portion of Africa's enrollment expansion can be explained by the emergence of a private tertiary education sector on the continent over the past two decades. Since 1990, private colleges, universities, and tertiary-level professional institutes have been established at a far faster rate than public ones. While public universities doubled from roughly 100 to nearly 200 between 1990 and 2007, the number of private tertiary institutions exploded during the same period, from two dozen to an estimated 468.*

Together with the expansion and diversification of the TE/HE sectors in the eight countries, there

were increasing demands on TE/HE institutions for quality, efficiency and accountability, and the need to regulate and assure the quality of the new (and in some cases existing) institutions and academic programmes moved onto the TE/HE governance agenda. There was also a need to coordinate various aspects of the growing (and in some cases emerging)[7] TE/HE systems in terms of, for example, the efficient allocation of funds and other resources; policy and planning for the development of the TE/HE sector, often in relation to national development objectives, and the information and expertise such policy development and planning requires; uniformity/equivalence across academic programmes and between institutions locally and abroad; and managing the increasingly important relationships between key TE/HE stakeholders (in particular, the government, institutions, the professions, the market and industry).

Broadly speaking, then, the councils/commissions included in this study *were created in response to the need to regulate, ensure the quality of and/or coordinate their growing and diversifying TE/HE sectors.* The initial focus of the councils/commissions at the time of their establishment included one or more of the following:

- As a (semi-autonomous) body responsible for regulating and ensuring the quality of the sector, with a particular focus on the accreditation and quality monitoring of new (and in some cases existing) institutions and programmes (Botswana, Kenya, Mozambique, South Africa, Tanzania and Uganda);
- As a funding agency or playing a role in the allocation and/or distribution of funds (Botswana, Ghana and Mauritius);
- As an expert/advisory body within the broader TE/HE governance landscape to inform policy and/or planning (Ghana and South Africa); and
- As an intermediary/buffer between (primarily) government and institutions (e.g. managing the government steering–institutional autonomy tensions or those relating to funding allocations) (Botswana, Ghana and South Africa).

Table 9.1 indicates the year of establishment of each council/commission and, where applicable, the date on which it became operational, as well as the legislation that established the agency and outlined its structure and mandate. The table also shows that, in some cases, the councils/commissions were established as entirely new bodies, whereas in other cases they had replaced or been established on the basis of an earlier, similar body. The oldest agency in the sample was the K-CHE, established in 1985, and the newest the M-CNAQ, established in 2007. Thus, some of the councils/commissions were relatively new organisations – in terms of both their date of establishment and the fact that they were established as entirely new organisations – and were therefore, comparatively speaking, in the early stages of development.

7 In Botswana and Mauritius, the TE/HE systems were so small at the time that they comprised basically one (well-resourced) public university and a few other small post-school institutions and, therefore, there was no real 'system' to speak of.

Table 9.1 Establishment of the councils/commissions

Council/ commission	Date of establishment/ operational	Founding Act of Parliament	New/based on previous organisational form
B-TEC Botswana	1999/2003	Tertiary Education Act No. 4 of 1999	New
G-NCTE Ghana	1993	National Council for Tertiary Education Act No. 454 of 1993	National Council for Higher Education
K-CHE Kenya	1985/1985	Universities Act of 1985	New
M-CNAQ Mozambique	2007	Decree of the Council of Ministers No. 63/2007	New
M-TEC Mauritius	1988/1990	Tertiary Education Commission Act No. 9 of 1988 (amended by Act No. 18 of 2005)	New
SA-CHE South Africa	1997	Higher Education Act No. 101 of 1997	University and Technikons Advisory Council
TCU Tanzania	2005/2005	Universities Act No. 7 of 2005	Higher Education Accreditation Council
U-NCHE Uganda	2001/2003	Universities and Other Tertiary Institutions Act of 2001 (amended in 2003 and 2006)	New

In terms of *legal status*, all of the councils/commissions were established by Acts of Parliament as bodies corporate with separate legal personality. These Acts are either general statutes that focus broadly on TE/HE, or specific statutes that focus solely on the council/commission. The Acts also set out the mandated functions and operations of the councils/commissions, although in differing degrees of specificity.

Although some of these bodies were constituted as 'councils' and others as 'commissions',[8] the eight councils/commissions in this study were *structured* in similar ways (see Table 9.2). All were led by a governing body comprising a council/board or commissioners, headed by a chairperson – except for the Mozambique M-CNAQ, which was governed by a president and executive and non-executive directors. The chairpersons and members were appointed either by the state president/ prime minister or by the minister responsible for TE/HE. The number of council members or commissioners varied from nine to 25. The day-to-day work of the councils/commissions was undertaken by secretariats of salaried staff and headed by a chief executive officer[9] who was appointed either by the council or commissioners, the minister or the state president.

In terms of *composition* (Table 9.2), seven of the eight councils/commissions comprised what could be termed 'stakeholder representative' membership insofar as at least a certain

8 According to Chirwa (2014: 7), in his review of the legislation giving rise to seven of the eight councils/commissions in this study, the contexts in which the terms 'council' and 'commission' are used 'show that these terms carry the same meaning'.

9 The heads of secretariats were also referred to as 'executive secretary', 'executive director' or 'commission secretary'.

number were to be nominated and appointed from within TE/HE institutions, ministries, government agencies and/or stakeholder groups (e.g. business and industry). In some cases, the membership was invested in the post and not the person; in other words, if the individual resigned from his/her post, s/he automatically lost membership on the council or board. Some of the councils/boards were also intended to be 'expert-based' bodies – at least to the extent that members had work experience in TE/HE institutions or government bodies, or where they were appointed (or co-opted) for their particular TE/HE-related knowledge and expertise.

Table 9.2 Council/commission composition and appointments (2012/2013)

Council/ commission	No. of members	Representative and or expert-based composition	Who appoints …		
			Chairperson	*Members*	*Head of secretariat*
B-TEC Botswana	Minimum of 14 members including Chair	Representative	President	Minister; co-opted members appointed by the B-TEC	Council
G-NCTE Ghana	19 Council members including Chair	Representative	President	President	President (with advice of G-NCTE in consultation with the Public Service Commission)
K-CHE Kenya	21–25 Commission members including Chair	Representative	President	Minister	Minister
M-CNAQ Mozambique	President + 3 executive directors + 5 non-executive directors	Expert	Prime Minister	Minister	n/a
M-TEC Mauritius	Chair + eight Board members	Representative and expert	Prime minister	Prime minister	Board (with minister's approval)
SA-CHE South Africa	Chair + 22 Council members	Representative and expert	Minister	Minister; co-opted members appointed by the SA-CHE	Council
TCU Tanzania	Chair + 15–21 Commissioners	Representative and expert	President	Minister; co-opted members appointed by TCU	Commissioners (vetted by the president via the ministry)
U-NCHE Uganda	18 Council members including Chair	Representative	President (from two names recommended by U-NCHE)	Minister appoints eight Council members; others are nominated by their institutions or sectors	Minister (on recommendation of U-NCHE)

All of the establishing Acts of Parliament provided for the formation of council/commission *committees* (some permanent), which generally did the work of reviewing, synthesising and making recommendations to/advising the council or board members, assisted by secretariat staff. Committees focused on a wide range of matters, both internal to the agency and with regard to their work with institutions including, amongst others, finance, quality assurance, staff appointments and remuneration, research, infrastructure, inspections, and monitoring and evaluation.

In terms of *financing* (Table 9.3), the councils/commissions in the study were all largely government-funded (85–100%) – except the TCU, which received only 40% of its funding from government in 2012. Additional (albeit small) sources of income for these agencies included fees charged for regulatory and quality assurance-related services; fees charged for student admissions (TCU); interest earned on bank balances and investments (B-TEC); and service charges levied on institutional grants (G-NCTE). Fees charged for services covered institutional accreditation and registration, programme accreditation, quality audits, grant of awarding powers, and/or recognition and equivalence of qualifications (Mohadeb 2013: 2).[10] In addition, a number of the councils/commissions received grants from international development partners and/or government departments for specific projects.

Table 9.3 Sources of funding for councils/commissions (2012) (%)

Council/ commission	Government funding	Fees charged for services	Other
B-TEC Botswana	85	11	4
G-NCTE Ghana	95	0	5
K-CHE Kenya	89	11	0
M-CNAQ Mozambique	100	0	0
M-TEC Mauritius	91	9	0
SA-CHE South Africa	98	2	0
TCU Tanzania	40	22	38
U-NCHE Uganda	100	0	0

10 Note that although the U-NCHE charged fees for quality assurance activities, these monies were remitted to the national treasury and could not be utilised by the agency.

In terms of *accountability*, the councils/commissions fell under the ministry responsible for TE/HE in their country. In legislatives terms, the emphasis in the respective Acts was on financial accountability (rather than accountability for performance or regulatory decisions) and usually required the annual audit of council/commission finances and the submission of annual financial reports to Parliament. In some cases, the councils/commissions were also required to submit annual reports of their activities to the minister who, in turn, submitted these to Parliament.

Finally, the establishment of the councils/commissions, together with their formal structures and legislative frameworks, their semi-autonomous status and their distinct organisational identities, suggests a degree of *institutionalisation* of these agencies within their broader governance systems. In addition, while two of the councils/commissions (the B-TEC and K-CHE) were restructured into new organisations during the time of the study, none of the interview respondents expressed the view that these agencies should be closed down. This points to the persistence, and hence institutionalisation, of these organisations (see Groenleer 2009: 42).

Functions and roles in tertiary/higher education governance[11]

The councils/commissions in this study had been mandated, via their respective founding Acts, to undertake a wide variety of functions – many in common, but also some functions that were unique within the sample of organisations. Some of their approaches were the same or similar – especially with regard to the regulatory and quality assurance functions that have increasingly standardised definitions, processes and procedures. Some functions (or 'duties') are listed in great detail in the relevant Act, while others are given broad mandates that are open to interpretation and operationalisation. For the purposes of analysis, we categorised this wide range of functions into five 'governance roles', namely regulatory, distributive, monitoring, advisory and coordination roles (see Table 9.4). It is important to highlight that these roles are not mutually exclusive and that there are, or certainly could be, useful linkages between them. In addition, regulatory, distributive and monitoring roles in TE/HE governance can be seen as part of the overall mechanisms for government steering of the sector.

11 In this study, a simple distinction between 'function' and 'role' was maintained, where a function refers to activities an individual or organisation engages in, in order to carry out their role in a particular context. In other words, the functions of a council/commission are those responsibilities and tasks it carries out (mandated or otherwise) which contribute to its role(s) in the overall governance of TE/HE in the country.

Table 9.4 Functions associated with different tertiary/higher education system governance roles

Regulatory	• Determining norms and standards for the sector, the equivalence of qualifications between institutions, and credit accumulation and transfer policies and procedures • Determining the regulatory framework (i.e. procedures, guidelines, criteria) for institutional and programme accreditation • Registering, licensing and/or accrediting new (and in some cases existing) public and/or private TE/HE institutions • Accrediting new and/or existing academic programmes of public and/or private institutions
Distributive	• Determining budget allocations for TE/HE institutions and/or the sector as a whole • Distributing financial resources from the state to institutions, units or individuals in the sector • Monitoring expenditure at both institutional and sector levels
Monitoring	• Collecting and analysing system and institutional-level data, including the development of performance indicators • Tracking developments and trends in the system, and performance and quality of institutions, against the norms and standards set for the sector or against stated national goals or system targets • Monitoring the quality assurance mechanisms or systems within institutions • Communicating identified problem areas to the minister or institutions, where relevant
Advisory	• Providing expert and evidence-/research-based advice to policy-makers and other TE/HE leadership in government and institutions, either proactively or reactively in response to specific requests • Commenting on or formulating draft policies on behalf of the ministry responsible for TE/HE • Providing advice (in some cases as 'recommendations') to the relevant government body on the licensing and accreditation of TE/HE institutions and the accreditation of their academic programmes
Coordination	• Enabling interaction between key stakeholders and policy spheres • Developing and maintaining agreement (a pact) between stakeholders about central TE/HE objectives and issues • Promoting the objectives of TE/HE institutions or the sector to the market and within government itself • Managing the relationships between key stakeholders (especially government and TE/HE institutions) • Strategic and financial planning (including setting targets) for TE/HE institutions and the sector (e.g. enrolments, institutional differentiation, financial and/or human resources and facilities) • Developing data and knowledge flows between different system-level governance roles • An oversight function ensuring no duplication, confusion or gaps with regard to who is doing what in the overall governance system

Table 9.5 provides a snapshot of the governance roles to which the councils/commissions were contributing; these are discussed in greater detail below.

Table 9.5 Overview of governance roles fulfilled by councils/commissions (2012/2013)

Council/commission	Regulatory	Distributive	Monitoring	Advisory	Coordination
B-TEC Botswana	•	•	•	•	•
G-NCTE Ghana	•	•	•	•	•
K-CHE Kenya	•	•	•	•	•
M-CNAQ Mozambique	•	–	–	–	–
M-TEC Mauritius	•	•	•	•	•
SA-CHE South Africa	•	–	•	•	•
TCU Tanzania	•	•	•	•	•
U-NCHE Uganda	•	•	•	•	•

Regulatory functions

Table 9.6 indicates the regulatory functions that were undertaken by the councils/commissions in the study.

All of the councils/commissions were involved in developing and publishing various norms, standards and guidelines as part of the regulatory framework for their respective TE/HE sectors with regard to the accreditation of institutions and/or their academic programmes; institutions' quality assurance systems and/or their general operations; qualification standards or the equivalence of qualifications; and credit accumulation and transfer procedures.

Of the six councils/commissions mandated to undertake institutional accreditation,[12] the majority were focused on the accreditation of private institutions.[13] This reflects the narrative that the origins of many of these organisations lay in the need to regulate a mushrooming private sector, but also, as Materu (2007: 56) observes: 'Until recently, public higher education institutions in most of Africa have resisted national accreditation efforts on the grounds that they are accredited de jure by the government charters or acts that created them.' Similarly, all of the seven councils/commissions mandated to undertake programme accreditation

12 The terms 'licensing', 'registration' and 'accreditation' essentially refer to the process by which applications to establish new TE/HE institutions are assessed according to set criteria in order for recommendations to be made to the regulatory authority on whether these institutions should be allowed to operate. Hereafter, the term 'accreditation' is used as shorthand.

13 This focus on the regulation of the private institutions has started to shift to public institutions too (e.g. the new Universities Act of 2012 in Kenya, which replaced the K-CHE with the Commission for University Education, includes the accreditation of public institutions).

were focused on private institutions, while not all were responsible for the accreditation of programmes in public institutions. While the M-TEC and C-NAQ had been mandated to undertake accreditation functions, these had not been implemented.

Table 9.6 Regulatory functions undertaken by councils/commissions (2012/2013)

Council/ commission	Developing regulatory frameworks and/or setting norms and standards for the sector	Registering or accrediting institutions		Programme accreditation	
		Public	*Private*	*Public*	*Private*
B-TEC Botswana	Standards for teaching, examinations and research in tertiary education institutions	•	•	–	•
G-NCTE Ghana	Norms and standards for infrastructural and operational requirements of higher education institutions	–	–	–	–
K-CHE Kenya	Standards and guidelines for quality control and accreditation; recognition and equivalence of qualifications	–	•	–	•
M-CNAQ Mozambique	Mandated to develop standards and quality indicators for institutions, but had not been implemented	•	•	•	•
M-TEC Mauritius	Regulatory framework for institutional and programme accreditation; recognition and equivalence of qualifications	–	•	•	•
SA-CHE South Africa	Qualification standards; credit accumulation and transfer procedures; criteria for programme accreditation	–	–	•	•
TCU Tanzania	Guidelines and minimum standards for institutional governance units, budgeting, academic programme approval, staff performance and promotion, and postgraduate training; recognition and equivalence of qualifications; credit accumulation and transfer	•	•	•	•
U-NCHE Uganda	Norms and standards for running and governance of institutions; minimum standards for courses of study	–	•	•	•

While there were similarities in the approaches adopted in both institutional and programme accreditation (largely owing to adherence to international practice), there were variations in where the decision-making powers lay (with the council/commission or the parent ministry) and in the extent to which the agencies had any leverage to compel institutions to comply with basic standards or criteria. All of the councils/commissions reported taking more of a developmental and supportive approach rather than a 'policing' or purely compliance approach to their regulatory activities. This was particularly so in the early phase – primarily because many private institutions were very new and needed capacity development and/or because quality assurance processes were relatively new in the country (and continent).

Distributive functions

Table 9.7 indicates the distributive functions that were undertaken by the councils/commissions in the study.

Six of the councils/commissions fulfilled two or more distributive roles, even though only three of these (the B-TEC, M-TEC and G-NCTE) were officially established as funding councils. The K-CHE was mandated by the Universities Act of 1985 to plan and provide for the financial needs of university education and research; to determine and recommend to the Minister of Higher Education, Science and Technology the allocation of government grants for university education and research; and to review the expenditure of these funds by higher education institutions. Similarly, the TCU was required to coordinate budgets, to collate information relating to the budgets of public universities, and to submit this information to the Ministry of Education and Vocational Training for consideration. The K-CHE, U-NCHE and TCU were meant to administer government funds for research or scholarships; however, at the time of the study, these functions were only partially implemented – and in the case of the TCU, not implemented at all.

There was little commonality between the agencies in terms of the spread of distributive functions undertaken (as evidenced in Table 9.7), which suggests that this role was shared between the councils/commissions and other government bodies in the system.

Table 9.7 Distributive functions mandated for and/or undertaken by councils/commissions (2012)

Council/commission	Making input into/ coordinating institutional or sector budgets	Determining budget allocations for institutions	Distributing financial resources to institutions	Monitoring financial performance of institutions	Mobilising additional funds for institutions
B-TEC Botswana	•	•	–	–	–
G-NCTE Ghana	–	•	–	•	•
K-CHE Kenya	–	•	•	•	•
M-CNAQ Mozambique	–	–	–	–	–
M-TEC Mauritius	•	•	•	•	–
SA-CHE South Africa	–	–	–	–	–
TCU Tanzania	•	–	•	•	–
U-NCHE Uganda	•	–	•	–	•

Monitoring functions

Table 9.8 indicates the monitoring functions that were undertaken by the councils/commissions in the study. Details of these monitoring activities are provided in Appendix Table A9.1.

Table 9.8 Monitoring and data functions undertaken by councils/commissions (2012/2013)

Council/ commission	Sector-level trends	Institutional performance	Quality assurance
B-TEC Botswana	–	–	•
G-NCTE Ghana	•	•	–
K-CHE Kenya	–	–	•
M-CNAQ Mozambique	–	–	–
M-TEC Mauritius	•	•	•
SA-CHE South Africa	•	–	•
TCU Tanzania	–	•	•
U-NCHE Uganda	•	–	•

Four of the councils/commissions were engaged in *monitoring aspects of their respective TE/HE sectors*. In two cases, the focus of this monitoring was limited: the M-TEC focused on student enrolments for both public and private institutions, and the G-NCTE on institutional infrastructure and operations. The SA-CHE and the U-NCHE had a broader focus: in addition to enrolments, the SA-CHE collected data on throughput and graduation rates, as well as participation across different categories of students, while the U-NCHE also included academic staff and programmes, physical and educational facilities, and institutional expenditure. Where available, statistics on the TE/HE sectors gathered during the monitoring process were published in one or more reports – most of which were intended to be produced annually although this was not always achieved.

It appears that the direct *monitoring of the performance of institutions* was not a core focus of the councils/commissions in the study. In the case of the M-TEC and the G-NCTE, the focus of institutional monitoring was on financial expenditure, while the TCU adopted a wider approach via site visits and on the basis of institutional reports.

While quality assurance is mainly the business of TE/HE institutions themselves, six out of eight of the councils/commissions in the study were engaged in *monitoring the establishment and implementation of quality assurance mechanisms or systems* within public and/or private institutions. Such monitoring was undertaken via quality or institutional audits, which followed similar approaches in each of the councils/commissions. Some councils/commissions had to begin their quality or institutional audit work by assisting institutions to establish quality assurance units and systems (since many of these were absent) and to provide capacity-building to those responsible for quality assurance activities within institutions.

Advisory functions

Table 9.9 indicates which of the councils/commissions were mandated with an advisory function and the focus of the advice given.

Table 9.9 Advisory functions undertaken by councils/commissions (2012/2013)

Council/ commission	Specific policy issues or problems	Draft policies, strategies or legislation	Licensing or accreditation of institutions
B-TEC Botswana	•	•	•
G-NCTE Ghana	•	•	–
K-CHE Kenya	•	–	•
M-CNAQ Mozambique	–	–	–
M-TEC Mauritius	•	•	–
SA-CHE South Africa	•	•	–
TCU Tanzania	•	–	•
U-NCHE Uganda	•	–	•

All of the councils/commissions (except the M-CNAQ) were mandated via their respective founding Acts to undertake some form of advisory function. In most cases, the Acts specified to some degree or another in which areas the council/commission was to give advice, although in two cases (the M-TEC and TCU) the advisory function was only broadly outlined.

Often, policy advice was given reactively; in other words, in response to a direct request from the minister (e.g. relating to a specific policy problem such as student fees, or to comment on a draft policy). The councils/commissions also offered advice proactively – usually on issues/problems that emerged during research or reviews of the TE/HE sector, or via monitoring activities such as institutional or quality audits. In some cases, the advice was submitted in writing to the minister; for example, in the form of a report with a focus on recommendations (SA-CHE) or in the form of policy briefs or position papers (U-NCHE). In only two cases (South Africa and Tanzania) was the minister required by law to account for *not* taking the advice of the council/commission; in other cases, it was not mandatory for the minister to seek or consider advice, or the advice did not have legal binding authority or strong recommendatory force. Nevertheless, councils/commissions' technical/expert-based advice was reported by ministry and agency respondents to be valuable – often in the absence of a lack of expertise in the ministry or national department itself.

The B-TEC was the only agency in the study that was mandated to undertake a policy-making function. In particular, Section 5(2) of the Botswana Tertiary Education Act No. 4 of 1999 stated that the Council 'shall formulate policy on tertiary education and advise Government accordingly'. The B-TEC had formulated policies or strategies on request/behalf

of the Ministry of Education and Skills Development, including Botswana's first Tertiary Education Policy, the Human Resource Development Strategy and the Research, Science, Technology and Innovation Strategy.

While in all cases there was an aspiration for policy advice to be research- or evidence-based, in practice at the time, the policy advice in some councils/commissions was based primarily on the experience of the council/commission members.[14] This was largely owing to the lack of research and data capacity in the organisation (and often in the parent ministries and institutions too) in terms of human resources/expertise and technology. In some cases, and where finances allowed, research was outsourced to, or expert opinion sought from, external consultants to fill this gap.

Coordination functions

Table 9.10 indicates which coordination functions were undertaken by the councils/commissions in this study, while specific details of these activities are provided in Appendix Table A9.2.

Table 9.10 Coordination functions undertaken by the councils/commissions (2012/2013)

Council/ commission	Strategic planning	Enabling interaction/ managing relationships between key TE/HE stakeholders	Promoting TE/HE objectives and priorities
B-TEC Botswana	•	•	–
G-NCTE Ghana	–	•	–
K-CHE Kenya	•	•	•
M-CNAQ Mozambique	–	–	–
M-TEC Mauritius	•	•	•
SA-CHE South Africa	–	•	–
TCU Tanzania	–	•	•
U-NCHE Uganda	–	•	•

Three of the councils/commissions (the B-TEC, K-CHE and M-TEC) were directly involved in *strategic planning* for their respective TE/HE sectors in some way or another. On the one hand, this involved making inputs into planning processes at the ministerial level or preparing the sector strategic plan itself. On the other hand, the planning was more focused on specific aspects of the sector, such as long-term institutional plans and

14 The exceptions were the M-TEC and SA-CHE which, over the years, had undertaken or commissioned a range of research to underpin their advice functions.

targets (e.g. staff development, academic outputs, physical infrastructure, quality assurance or budgeting); resources, facilities and staff utilisation for the sector; and national human resource development requirements.[15] Some of the councils/commissions had established divisions that focused on planning.

In terms of *enabling interaction and managing relationships* between key stakeholders, some of the councils/commissions (in their official documents and via interview respondents) referred to themselves as 'intermediary' or 'buffer' bodies. The terms 'intermediary' and 'buffer' are taken to refer to particular roles that organisations play in helping to manage the relationships between key TE/HE stakeholders. In an intermediary role, councils/commissions undertake 'bridging' or 'linking' functions (e.g. providing platforms and channels of communication for stakeholders and policy spheres to interact). As buffer bodies, the agencies essentially 'buffer' or 'protect' key stakeholders (especially TE/HE institutions, government and the public) from one another. Three of the councils/commissions in the study were established as buffer bodies: the B-TEC and G-NCTE in the sense of mediating between government and TE/HE institutions in order to protect the academic or institutional autonomy of the latter; and the TCU in terms of buffering the ministry from the day-to-day problems and requests from institutions. A number of the councils/commissions were also involved in facilitating interaction between key stakeholders in order to discuss key TE/HE issues, primarily via the hosting of conferences, colloquia or seminars, or via participation in the committees or boards of other stakeholder bodies.

In terms of *promoting TE/HE objectives*, the councils/commissions in the East Africa region (K-CHE, U-NCHE and TCU) were required to undertake functions that promoted various national or sector objectives for TE/HE in each country. These included, amongst others, the promotion of 'national values such as unity and identity in universities'; 'gender equality, balance and equity'; 'cooperation and networking among universities'; and 'national interests in the courses of study and professional qualification' in institutions (Chirwa 2014: 34). The promotion of these objectives was undertaken primarily via the organisation of annual exhibitions that brought together TE/HE institutions, prospective students and/or business and industry.

Another form of coordination and the promotion of TE/HE objectives – in terms of the efficient distribution of students across institutions and the promotion of access – was the coordination of student admissions. In this regard, the TCU was responsible for setting academic criteria for student admission into universities; approving admissions into institutions; and providing a Central Admission System (CAS) for university institutions. The K-CHE was also mandated to provide a central admissions service to public universities and the Central Universities Admission Committee of the Commission had been established to this effect. However, the K-CHE was not able to implement the coordination of student admissions function, primarily because of the lack of capacity in the organisation and the 'resistance of the university senates to relinquish their mandate of admission of students to respective degree

15 In order to inform their planning around human resource development requirements, the M-TEC in Mauritius conducted employer surveys every two years to obtain feedback on the graduates who were entering the labour market, as well as graduate tracer studies every four to five years.

courses' (Kenya Ministry of Education 2008: 28). This led to the establishment of the Joint Admissions Board that was managing the central admissions system at the time of the study.

Support functions

Finally, three of the councils/commissions undertook *support* functions that are not considered to be part of a governance role. These included providing information technology and other technical support to public institutions and other institutions outside of the tertiary education sector (M-TEC); career guidance and counselling for prospective higher education students (U-NCHE) (although this had not actually been implemented); and various donor-funded projects (TCU). Arguably, these are all important services provided by the councils/commissions concerned, especially given the lack of capacity in other parts of the system (and particularly in the parent ministry and its TE/HE department or unit), as well as the unique position these agencies occupy (i.e. between government, institutions and other key stakeholders). However, this can also be considered to be a potentially detrimental 'function drift', not least because of the existing constraints on capacity and hence the potential for such support services to direct existing capacity away from core functions. Indeed, a number of interview respondents from both the councils/commissions and their parent ministries raised questions about the appropriateness of these agencies carrying out such functions.

Capacity, data and leverage

Part of the rationale for the establishment of semi-autonomous government agencies is to bring specialised expertise into different spheres of public sector governance. The councils/commissions in this study had developed, or were in the process of developing, *specialised expertise* for key TE/HE functions – both internally within their organisations and externally within institutions and the sector at large – around, for example, quality assurance, planning, research, policy advice and stakeholder engagement. Arguably, this was bringing capacity into the system that was not available in the parent ministries or their departments.

Having said this, the most commonly cited obstacle to function implementation in all eight councils/commissions was the *lack of capacity*. On the one hand, this manifested as shortages of staff within the organisation in general because vacancies had not been filled (M-CNAQ and TCU), and specifically in relation to particular tasks – most commonly institutional or programme accreditation but also in other areas. In terms of institutional accreditation, the severest shortages were in the U-NCHE in Uganda where only two staff members were available for the registration and accreditation of 175 institutions. In some councils/commissions, there were also shortages in terms of programme accreditation although this was alleviated (or had the potential to be alleviated) through the use of external

subject specialists from TE/HE institutions, professional bodies and industry.[16]

On the other hand, the capacity issue was described in terms of expertise – both within the councils/commissions and within the broader sector – in specialised areas such as quality assurance, research and data analysis. To some extent, the shortage of quality assurance expertise was inevitable given the relatively recent formalisation of quality assurance in many of these systems and, in some cases (such as Botswana and Mauritius), because of the small size of the countries. In order to begin to address these capacity problems, some of the councils/commissions (or the individuals within them) had invested in capacity- or expertise-building initiatives – internally and within the broader system.

Comprehensive and up-to-date data on TE/HE institutions and the sector is a key resource in the effective implementation of a range of functions including, for example, to inform decisions about the accreditation of institutions or the allocation of funds; policy advice to government; and strategic planning for both institutions and the sector. Four of the eight countries had a tertiary or higher education management information system (TEMIS or HEMIS) in place (Botswana, Ghana, Mauritius and South Africa) but only two of these (Mauritius and South Africa) were comprehensive in nature.[17] The other four countries (Kenya, Mozambique, Tanzania and Uganda) did not have a TEMIS/HEMIS – although there were plans (some of which were already underway) to develop such systems in the future. Furthermore, only South Africa had an effective mechanism to leverage data from institutions insofar as the national Department for Higher Education and Training could withhold funding from institutions if they did not submit the required data.

In order to fill these gaps in TE/HE data, some of the councils/commissions (e.g. the K-CHE, U-NCHE and TCU) attempted to collect data directly from individual institutions (via requests for information or conducting surveys), as well as from regulatory agencies, examination centres and embassies. However, the councils/commissions faced a number of difficulties in collecting data from (especially private) institutions – either because it was not available at all or because it was only available in hardcopy format.

All of this suggested a need for incentives and capacity development within the national system and within institutions around the collection of TE/HE data.

A potential obstacle to effective steering relates to the *absence of leverage and/or sanctions* available to either the council/commission or the parent ministry to compel institutions to meet quality or accreditation standards or to achieve priority targets. There were examples of such steering mechanisms in place, such as the K-CHE's (Kenya) power to deregister an institution, withdraw a programme or prevent graduations in a particular cohort should prescribed standards not be met; the TCU's (Tanzania) capacity to limit enrolments (via its

16 In South Africa, for instance, the SA-CHE utilised one external peer reviewer per programme accreditation application and up to three reviewers to conduct site visits and obtain additional information, where necessary.

17 For example, the Mauritius TEMIS, which was housed and managed by the M-TEC, contained data on enrolments, programmes, staff, budgets, expenditure and research, amongst others, in both public and private institutions. Reports were published using this data and, in addition to informing the work of the various divisions of the M-TEC, other stakeholders drew on the TEMIS data. The database was updated on a regular basis via surveys and research studies.

Central Admissions System) to institutions that did not have adequate resources; and the M-TEC's (Mauritius) ability to use its funding mandate to leverage institutions to meet their performance and/or quality targets. However, such mechanisms were not in place in other countries. And, while some interview respondents acknowledged the benefits of linking regulatory and distributive functions for the purposes of leverage or sanctions, others questioned whether these roles should be played by the same agency.

Power dynamics, pacts and coordination

There were also systemic features that were impacting on the ability of the councils/commissions to carry out their roles effectively. One of these was the *power dynamics between these agencies their parent ministries*. In the positive sense, a number of interview respondents referred to the importance of a cooperative working relationship with the parent ministry, recognising that councils/commissions cannot operate in complete isolation from their political environments. However, there were also observations that if institutions and other key stakeholders perceive the council/commission as being too close to the parent ministry, or as the implementation arm of a political agenda, this could undermine perceptions of their independence. There was thus a sense in which these agencies were challenged to maintain the delicate balance between independence and cooperation.

On the other side of the coin, there were reports of *political interference* in the decision-making of management (especially relating to regulatory decisions or recommendations) and also in terms of government ignoring the advice of or bypassing the advisory function of the councils/commissions. This is perhaps not surprising given the inherent tensions between the parent ministry and its agencies with regard to control, autonomy and accountability. Speaking generally about such relationships in the African context, and echoing Moja et al. (1996) on weak African bureaucracies in the 1990s, Caulfield (2006: 23) points to some of these power issues:

> *Where agencies are created out of a de-bureaucratisation reform process, permanent secretaries are resentful and, in Africa, political ministers are equally resentful of the conditionality attached to reform policy by donors. In other words, at the political level there is an acute sense of loss of ownership, and at the bureaucratic level loss of status and power. … The inevitable clash between the two organisations, one dynamic and enterprising and the other conservative and rule bound, has a real impact on communications between them.*

There were echoes of this idea in the current study, as expressed by interview respondents, to the effect that some parent ministries regarded the councils/commissions as too independent and/or as unacceptably critical of government, resulting in the agencies being ignored or side-

lined. This has potentially significant ramifications for the fulfilment of these agencies' roles in governance. In particular, if a council/commission does not or cannot apply its expertise, or leverage its power and authority owing to political interference, it runs the risk of becoming a 'post box' in the system; an unnecessary intermediary. This is also a real danger of not having a clearly agreed-to role in the governance system.

Another aspect of this relates to the tension between, on the one hand, parent ministries' control over their agencies via the parameters set out in their founding Acts of Parliament as well as their accountability requirements (which effectively constrain their behaviours and curb their autonomy) and, on the other hand, the delegation of responsibilities (functions) to the councils/commissions as expert bodies. As Groenleer (2009: 37) argues, the 'information asymmetry' between expert-based agencies and their parent ministries 'makes it difficult for principals to control the behaviour of agents by monitoring and sanctioning', making it possible 'for agents to develop their own preferences and interests.' Groenleer refers to this as 'agency slippage', which can also be explained by the notion of institutional path dependency. As highlighted earlier, when models of agency are imported into new contexts they are not adopted wholesale; rather, they are shaped by institutional path dependencies. As Gornitzka and Stensaker (2014: 6) observe: 'What happened at an earlier point in time will affect the possible sequence of events occurring at a later point in time.' This can result in unintended consequences of initial institutional designs and gaps between intention and practice (ibid.): 'Once in place institutions tend to take on a life of their own and their internal dynamic creates a gap between intention of institutional designers and institutional practice. This happens as ways of doing things become institutionalised, and institutions spell out and interpret their own standards.' This echoes what we have termed 'function drift', namely incidences where councils/commissions were undertaking functions that were not originally mandated in the legislation or were somewhat marginal to their primary focus.

What are some of the factors that impact on the autonomy and independence of councils/commissions? One possible issue is the close involvement of the parent ministry in the appointment of council/board members and, in some cases, where the minister has to give his/her approval to the appointment of the chief executive officer and even secretariat staff. Another factor is the sometimes heavy reliance on government for funding, although there was disagreement amongst interview respondents about this. Arguments against the challenge to autonomy because of financial dependence generally rested on the idea that the relevant Act of Parliament protected the agency from such interference. Arguments put forward as to why financial dependence could potentially threaten autonomy rested on the notion that 'he who pays the piper, calls the tune'. Finally, some interview respondents made the point that the style and approach of individual ministers, and the nature of the relationship (paternalistic, cooperative) between the council/commission and its parent ministry, had different implications for the agencies' independence from or cooperation with the parent ministry.

Another feature of the broader governance environment that was impacting on the councils'/commissions' function implementation was the *absence of a clear pact (or agreement) amongst*

key stakeholders regarding the vision for TE/HE in the country (see Cloete et al. 2011: 165–167) and, linked to this, very *limited coordination at the system level*. A pact and overarching coordination clarifies which functions need to be fulfilled and the resources required for their implementation (e.g. expertise, human resource capacity, funding, data/information systems and appropriate leverage, incentives and sanctions).

To the extent that the councils/commissions were operating in the absence of a pact and limited coordination, they were vulnerable to fluctuating external influences and mixed messages (e.g. shifting priorities/agendas or demands from the environment, or duplication, confusion or gaps within the broader governance system). This can result in a scenario in which the councils/commissions must constantly negotiate their roles in the system as well as the resources/capacity they need to carry out their functions. This is not to ignore the fact that systems such as TE/HE governance systems develop on the basis of ongoing interactions between key stakeholders and institutions and that 'institutional survival often involves active political renegotiation and heavy doses of institutional adaptation' (Thelen 2004: 8). It is simply to point out that if not checked, such constant renegotiation in the face of ongoing challenges to roles, division of labour, authority and routine access to resources can lead to a process of de-institutionalisation and thus institutional instability and the failure of function implementation.

The absence of a pact and limited coordination can also leave the councils/commissions adrift in terms of a guiding framework for certain of their functions. For instance, with regard to institutional accreditation, in some countries there was a proliferation of private institutions which, in certain cases, had significantly low enrolment numbers, as exemplified by the following:

- In Uganda in 2010/2011, 137 out of 187 tertiary education institutions were private, some of which had very small enrolments (e.g. 14 theology colleges with a total enrolment of 1 597 students or 61 management/social development colleges – of which only five were public – with a total enrolment of 5 547).
- In Tanzania in 2011/2012, there were 11 public universities/university colleges with 114 531 enrolments versus 23 private institutions with 51 953 enrolments.
- In Mauritius in 2011, there were 70 tertiary education institutions, 59 of which were private, with a total student enrolment in the sector of 35 906 – and this in a country with a population of around 1.3 million (2012 estimate).

This raises the question as to why these councils/commissions were registering or accrediting so many private institutions. This again talks to the absence of a pact or, more specifically, a broader national plan linked to the countries' development model for differentiation or planning for the sector (e.g. in relation to the labour market or national development objectives), to guide the councils/commissions in their regulatory work. This could be considered a failure of steering. It also flags the mismatch between function implementation and capacity in the light of personnel shortages for institutional accreditation highlighted as a key issue in this chapter.

Finally, there were other indications of the lack of coordination and system oversight at the time of the study. One of these was the problem of duplication, confusion and/or gaps in the legislation or governance system in terms of what different state bodies were mandated to do. In three cases in particular (the M-TEC, TCU and U-NCHE), interview respondents reported that their council/commission faced challenges or were not able to implement certain of their functions because of such duplication or gaps. Another indication of lack of coordination, already highlighted, was the lack of comprehensive data on both public and private institutions (most noticeable in Kenya, Mozambique, Tanzania and Uganda).

Concluding comments

Castells (1993, 2001), in his historical analysis of the functions of universities, identifies four overlapping and contradictory roles for the university. His discussion of these roles rests on the traditional view of universities as autonomous. Arguably, however, the management of these contradictory functions requires some form of national steering – and this is perhaps especially so in the developing country context.

A reading of the individual case studies and the comparative analysis provided in the synthesis report indicates a shift from a state control to a state supervision model of governance, with its focus on steering, in the eight countries in this study. This is evidenced by, amongst others, the existence of parent ministries with specific departments or units with a TE/HE focus, and of legislation, policies, plans and/or strategies relating to the direction and operation of TE/HE institutions and the sector, as well as the establishment of councils/commissions with specialised TE/HE functions and expertise, and with semi-autonomous status in order to limit political interference. The delegation of steering functions (regulatory, distributive and monitoring) to the councils/commissions is a positive development given the limited TE/HE expertise and steering capacity in the national departments (except for South Africa) (see Cloete et al. 2011: 42), which were often referred to as playing an administrative role in the sector.

However, as highlighted in this chapter, various factors were inhibiting the ability of the councils/commissions to carry out their governance roles, including a lack of capacity and appropriate expertise; the lack of comprehensive and up-to-date data; the absence of the necessary leverage or sanctions to compel institutions to meet their targets; and the absence of a pact and system-level coordination to guide the work of the councils/commissions within the overall system. Furthermore, the councils/commissions are part of the institutional architecture of TE/HE governance in their respective systems, and even where they have been restructured recently (i.e. Botswana and Kenya) this was in order to strengthen their role rather than diminish it. Nevertheless, where the councils/commissions were experiencing capacity challenges, function drift or role confusion, contested political autonomy, and were having to negotiate their roles and access to resources, this indicates that they were not fully

institutionalised. As such, they could be considered a 'barometer' of the evolving governance systems within which they were operating.

In conclusion, the key findings of this study point to a number of *policy issues*, including the need for a detailed national plan for TE/HE in each country; a review of governance roles and coordination at the system level; capacity-building and identification of expertise; the development and maintenance of TE/HE management information systems; and clarity regarding autonomy and political independence.

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Appendix tables

Table A9.1 Examples of council/commission monitoring activities

Sector-level trends	
G-NCTE	Implementation of norms and standards set for institutional infrastructure and operations. Based on data collected by the National Accreditation Board and data collected by the G-NCTE in relation to targets.
M-TEC	Produces an annual report, *Participation in Tertiary Education,* which covers student enrolments across all tertiary education institutions in the country. Data collected from institutions, examination centres and embassies and high commissions (in the case of foreign institutions).
SA-CHE	Produces various publications on performance of the sector using data from the HEMIS and from StatsSA. Covers student enrolments, throughput and graduation rates; participation by race, gender and nationality; staff complement. Also developing performance indicators to inform the Department of Higher Education and Training in their development of the system.
U-NCHE	Statistics on student enrolments, academic programmes, academic staff, physical infrastructure and educational facilities, as well as institutional funding and expenditure, amongst others. Based on data collected from institutions and published in *State of Higher Education and Training in Uganda* reports.

Institutional performance	
G-NCTE	Financial expenditure of institutions based on audited accounts submitted.
M-TEC	Financial expenditure of public institutions on the basis of quarterly financial reports and against budgets, institutional long-term plans and national priorities for the sector. Informs further release of funds from the Ministry for Tertiary Education, Science, Research and Technology for public institutions.
TCU	Monitors relevance, general management and performance via site visits and technical inspections, as well as each university's resource base in relation to its academic programmes and related functions, based on submission of various institutional reports.

Quality assurance mechanisms	
B-TEC	Institutional audits of public and private institutions – assessing institutional systems for monitoring and enhancing academic quality and standards. Based on *Internal Quality Assurance Guidelines for Tertiary Institutions* and *External Quality Assurance Audit Framework for Tertiary Institutions.*
K-CHE	Quality assessments and quality audits. Based on the *Handbook on Processes for Quality Assurance in Higher Education in Kenya.*
M-TEC	Quality audits of public institutions undertaken in five-year cycles. Based on the *Quality Audit Handbook.*
SA-CHE	Institutional audits – effectiveness of quality assurance arrangements in institutions. Based on the Higher Education Quality Committee's *Framework for Institutional Audits.*
TCU	Institutional audits of quality assurance mechanisms in universities.
U-NCHE	Mandated to monitor the quality of implementation in institutions against the *Quality Assurance Framework for Universities and the Licensing Process for Higher Education Institutions*. However, only partially implemented.

Table A9.2 Examples of council/commission coordination activities

Strategic planning	
B-TEC	Developed the frameworks for institutional planning (including governance, academic, financial and infrastructural planning), and undertaken capacity-building in institutions in the use of these frameworks. Implementation of these to be monitored in future. Also mandated to coordinate long-term planning for the sector, including the coordination of funding for the sector, but this function had not been fully implemented at the time.
K-CHE	Long-term student enrolment planning, informed by graduate tracer studies and university needs assessments, which is used to inform government regarding funding for public institutions and to identify priority fields of study. However, limited implementation of this function. Strategic planning for the sector, as well as participation in the development of the MHEST strategic plan for higher education and the second medium-term plan for higher education as part of Vision 2030.
M-TEC	Planning for the graduate labour market: employer surveys every two years and graduate tracer studies every 4–5 years. From these, M-TEC develops a List of Indicative Priority Fields of Study that is given to students to guide them in their course selection and that is also used to guide the allocation of scholarships and bursaries. Also developed strategies and strategic plans for the sector as a whole (including budgets for these plans), in order to realise the policy objectives of the MTESRT.

Enabling interaction and managing relationships between key TE/HE stakeholders	
B-TEC	Established as a buffer body to maintain the balance between government steering of academic programmes and universities' academic freedom.
G-NCTE	Established as a buffer body to prevent political interference in tertiary education institutions with the emphasis on protecting institutional autonomy. Also participated in a range of meetings and on the boards of key stakeholders in government and private sector.
K-CHE	Organises stakeholder seminars (linked to annual exhibitions) to discuss higher education issues.
M-TEC	Organises conferences on tertiary education issues.
SA-CHE	Organises conferences and colloquia on higher education issues.
TCU	Organises forums to bring higher education stakeholders together to discuss higher education issues, and acts as a buffer or intermediary body between government and universities, particularly around issues arising within the institutions.
U-NCHE	Mandated to receive and investigate complaints regarding higher education institutions (e.g. relating to the quality of teaching and research or to the availability of facilities and resources) and to take appropriate action.

Promoting TE/HE objectives and priorities	
K-CHE	Organises annual exhibitions during which recognised Kenyan universities showcase and market their academic programmes to the public. The aim is to promote the role of universities in socio-economic development and to foster university-industry partnerships. Since 2002, exhibitions have been held in Nairobi and other centres around the country.
M-TEC	Promotes coordination of research through administration of various research support schemes including Masters/PhD scholarships/bursaries and postdoctoral fellowships; funding applied research in university-based centres; national research chairs; and a publication grant scheme. Also promotes open and distance learning in line with the national need for distance education and training (e.g. by fostering networking between institutions; developing think-tanks on ODL-related matters to support local and regional initiatives; and collecting data on and developing quality assurance frameworks for the provision of ODL in Mauritius).
TCU	Organises exhibitions where universities come together to show their products and services, and to meet and share ideas, and coordinates student admissions to universities via the Central Admissions Service.
U-NCHE	Promotes higher education, vocational courses and skills, and science to the broader public via annual exhibitions involving institutions and business representatives. Targeted at secondary school A-level students.

CHAPTER 10

UNIVERSITY ENGAGEMENT AS INTERCONNECTEDNESS: INDICATORS AND INSIGHTS

François van Schalkwyk

Introduction

In one of the most famous scenes from the James Bond movie franchise,[1] 007 is shackled to a solid gold table in arch villain Goldfinger's hi-tech lair. As an industrial laser beam progresses ever higher between Bond's parted lower limbs, the nervy but unshaken secret agent goads Goldfinger: 'Do you expect me to talk?' To which Goldfinger replies: 'No, Mr Bond. I expect you to die.' What Goldfinger goes on to say is less well-known: 'There is nothing that you can talk to me about that I don't already know.'

Universities are more commonly likened to ivory towers than to the impenetrable and typically remote lairs of Bond villains. However, their isolation from society is common to both. And while it is not the intention of this chapter to make inferences as to similarities between Bond villains and university vice-chancellors, universities are often criticised for assuming, as Goldfinger does, that there is little to be gained in the knowledge enterprise by engaging with intruders into their domain. And yet, Bond always finds a way in, without creasing a collar. Capture inevitably follows but escape is guaranteed and, moments later, the secluded villainous facility self-destructs. While there are those who predict the extinction of the university as we know it, perhaps an analogy that ends in self-destruction begins to waver at this point. However, it remains true that academics are increasingly expected to engage with those beyond their ramparts and that, in doing so, they are expected to exchange knowledge in order to contribute to the development of society.

A central tenet of the Higher Education Research and Advocacy Network in Africa (HERANA) project is that Africa needs a robust, differentiated higher education sector in order to bolster the continent's development. A critical element in such a differentiated

1 Close to one million views on YouTube alone (as at 30 October 2013).

system is a cluster of research-intensive universities producing new knowledge to stimulate innovation and development at regional and national levels. However, findings from the HERANA Phase 1 research indicated that the eight African flagship universities under study were engaging in activities (such as consultancies or service-orientated work), fuelled by the need to secure external research funding, that were responding to the needs of communities but that were not necessarily contributing to the production of new knowledge.

As part of the second phase of the HERANA project, the current study sought to examine more closely the impact of university–community engagement projects on the university, and therefore by implication on development, as academics grapple with the tension between engaging with those external to the university while simultaneously strengthening the core university functions of knowledge production (research) and transfer (teaching).

Expanding on the work done in the HERANA 1 project, the following three propositions were put forward in this study:

Proposition 1: University–community engagement must contribute to building stronger universities – in both teaching and research – in order for the university to fulfil its potential contribution to development.

In sub-Saharan Africa, in a context of relatively underpaid and poorly incentivised permanent academic staff, engagement is often synonymous with consulting work. Furthermore, there are those who warn of the dangers of engaged research becoming dislocated from the academy and from home-grown development prerogatives and strategies, as researchers genuflect to the research prerogatives of government and international funding agencies (Cloete et al. 2011). As Mkandawire (2011: 19) states:

> *The aid establishment today commands much of the intellectual resources devoted to development through its own research agenda, through the consultancy industry and through its selective support of research programmes and epistemic communities in developing countries. … Many academics inside and outside have been drawn into this system as they move freely through the revolving door linking academia, the consultancy industry, philanthropic organisations and international financial institutions.*

Following the 2012 AsiaEngage summit, Sharma (2012) reported in *University World News* that:

> *[U]niversities and non-governmental organisations alike were beginning to think of community engagement not as an ad hoc activity, but one that was important to sustain and could become as vital to universities as teaching and research. [However] it was clear that community engagement had to be integrated into research for university-community engagement to be sustainable.*

At the national level in South Africa, a study commissioned by the Higher Education Quality Committee indicates that many engagement initiatives carried out by universities are, in fact, ad hoc in nature, fragmented and not linked in any way to the academic project (DHET 2013: 39). Hinting at the possibility of state funding being linked to engagement activities (as it currently is in the case of research outputs and teaching), the *White Paper for Post-School Education and Training* (ibid.) states unequivocally: 'it is likely that future funding of such initiatives in universities will be restricted to programmes linked directly to the academic programme of universities, and form part of the teaching and research function of these institutions.'

The university in the guise of service provider to the community, that does little more than import and transfer existing knowledge instead of creating new knowledge, will at best make a marginal, short-term contribution to development. In fact, one could argue that community service organisations and corporate social initiatives are better placed to deliver services to the community; that the state has an obligation to do so; and that the university would do better to partner with these entities to deliver services, thus allowing universities to maintain their focus on their core functions of teaching and research.

Proposition 2: An empirically grounded notion of university–community engagement is required in order to provide an indication of the nature and impact of current engagement activities.

'Engagement' is a slippery concept. It means different things to different universities and stakeholders, and there is no single universal definition of engagement. 'Service learning', 'outreach', 'community engagement', 'scholarly engagement', 'university–industry linkages', 'third mission' and even the 'popularisation of science' are examples of university-based activities that fall under the umbrella term of engagement. Given that the concept of 'engagement' is highly contextual and ideologically embedded, and therefore problematic when attempts are made to quantify, qualify or compare engagement-like activities, and that an empirically grounded concept is sought to operationalise research on engagement activities, the concept of 'interconnectedness' is offered as a way out of the ideological quagmire.

Interconnectedness describes the relationship (in tension) of academics engaging with those outside of the university while simultaneously linking back to the university. Interconnectedness is operationalised along two dimensions: (i) articulation, which describes the extent to which engagement activities link to the university's strategic objectives and to external constituents, and (ii) the academic core, which describes the extent to which engagement activities link to the university's core functions of research and teaching and learning.

Proposition 3: It is neither helpful nor sufficient to introduce a new concept such as interconnectedness into the already murky waters of engagement.

At present there is a dearth of even the most basic data on university–community engagement activities (such as the number of projects, who they are engaging with, how they are engaging, etc.). Watson et al. (2011), in a study of engagement activities at 20 universities across the globe, found that 'very few' universities in the sample could account for the number, nature or impact of their engagement activities.

In his 'Engagements with engagement', Muller (2010: 85) concludes as follows:

> *This does not absolve us from the requirement to find ways of identifying it [engagement], providing funding for more rather than less promising efforts, and finding robust ways to measure it. But it does mean that theory will only help us so far, and that although an inductive process of identifying successful engagement practice will be time consuming, it is probably the only sensible way to begin constructing a typology of engagement best practices that might suit the diversity of institutional and development contexts.*

Therefore, interconnectedness needs to be quantified so that higher education stakeholders (including the state, steering bodies and funders) may glean the actual nature and impact of engagement activities on universities; in particular, the extent to which engagement activities are impacting on the university as key knowledge producer.

However, to claim a single, unopposed function for the university is to mask the complexity of the socio-political context in which universities seek to thrive. Castells (2001, 2009), in his historical analysis of the functions of universities, identifies four roles for the university. He points out that these functions are not mutually exclusive and that universities must be robust and dynamic enough to withstand and manage the tensions inherent in the simultaneous performance of multiple, often contradictory, functions. Two such university functions that emerged (and that stand in opposition) as the university was expected to become a 'productive force' (see Chapter 1) are that of the university being connected to the informational economy (by fulfilling its role as a primary knowledge-generating institution in society), and of simultaneously being connected to the socio-cultural changes in society (by fulfilling a role of applying its store of knowledge to challenges faced by contemporary society).

Castells' analysis is not that dissimilar from Cloete et al.'s (2011) conflicting notions of the university's relationship with national development at play in African universities. Cloete et al. identify a dichotomy between an instrumentalist notion of the university as a service provider responding to the needs of society, and an influential notion of the university as an engine for development participating in innovation systems by contributing new knowledge. In both these authors' conceptions of the roles and functions of the university, the university must navigate, respond to and manage the tensions that emerge as it is expected to dance to different tunes.

The strategic response of the university to external pressures in terms of its role in society is mediated by what Clark (1983) refers to as the 'middle structure'. In the middle structure, university management confronts and interprets external pressures in the interstitial position it occupies between the state (and supranational agencies and global funding source), and the discipline-loyal cadre of academics forming the 'academic heartland' or 'under structure'. But the under structure, in the execution of its daily tasks, formulates its own response as it calculates how to behave in the face of conflicting demands to respond to society by engaging

with those outside of the university, while simultaneously remaining loyal to the core function of disciplinary progress through the creation of new knowledge (most often presented as 'basic' or 'blue sky' research). In this sense, the university academic as the primary knowledge worker in the under structure must become interconnected – rather than simply connected in a unilateral fashion – and must constantly mediate the tension inherent in the contradictory demands of being connected to both society and the knowledge enterprise.

From within the 'engagement movement' there appears to be a tacit acknowledgement that key information on university engagement projects is not being adequately recorded, and that more research on university engagement and its impact is needed. A fuller and clearer understanding of what effect engagement is having, both on external communities and on the university itself, is required. In addition, there is awareness that the success of engagement as a sustainable academic activity is contingent on it being integrated into the core functions of the university.

In light of the above, the key research question that this study seeks to answer is:

1. How are academics at African universities negotiating the tension between (i) engaging with those external to the university and (ii) ensuring that their activities link to the core functions of the university in a manner that is both sustainable and in alignment with the strategic objectives of the university?

In order to answer the primary research question, this study endeavours to answer the following set of secondary questions:

2. Can a set of indicators be developed to quantify the extent to which university engagement activities link to both stakeholders and to the university's core functions of teaching and research, in a manner that is both sustainable and in alignment with the strategic objectives of the university?
3. Can the collection of indicator data be designed in such a way that it can be easily replicated by universities? And, can the indicators be represented in such a way that they are useful to universities in recording, tracking and assessing the engagement activities of academics?
4. When applied to university engagement activities at two African universities, what do the indicators reveal about the extent to which such engagement activities can be described as being interconnected?

Conceptual framework

That academics have always engaged with those outside of the university is not contested, despite claims of their perennial seclusion in ivory towers (Anderson 2001). Merton (in

Etzkowitz et al. 1998) shows that between 30–60% of university-led scientific innovation in the 17th century was in response to the needs of those located outside of the university – that is, government and industry. A study by Cantoni and Yuchtman (2014) shows how the universities of Germany contributed to the economic growth of that country over 500 years ago. They pragmatically acknowledge that universities were not the only contributing factor to economic growth, but that universities were established in response to the increase in economic activity in medieval Europe. Whether a causal contributor or a direct response to the economic revolution of the time, there is an implicit relationship between the university and the economically active sectors of society that preclude the possibility of the university as an ivory tower, disconnected from the market towns of Europe. What is undoubtedly different for the modern-day university and for the academics working within their ever-more porous glass walls are new pressures that are being brought to bear on the university as organisation and on its core productive activities of knowledge creation and transfer.

New exogenous pressures for change

Fundamentally, the notion of 'engagement' or 'third mission' in the higher education literature is used to denote the university's closer relationship with the market and/or society in order to meet the needs of society. These 'needs' originate from changes in, and the concomitant pressures exerted by, society for higher education to make a contribution to the well-being of society at large. The most commonly referred to pressures are globalisation, accountability, massification and reduced public funding (Brennan 2008; Gornitzka 1999; Maassen & Olsen 2007; Neave & Goedegebuure 2000). Other pressures emerge from changes in the environment, paramount amongst these being the advent of the internet and rapid advances in information and communication technologies (ICTs). Peterson (2007) identifies seven environmental dynamics as change drivers, namely: diversity, telematics (or ICT), quality, new learning markets, economic productivity, globalisation and resource constraint. Tierney (2004) identifies the following four pressures that are a result of changes in the environment in which universities operate:

- Limited resources (increasing costs associated with decreasing income);
- Changes in the workplace (both on campus in the case of academics and university administrators, and off campus in the case of graduating students);
- The rapid uptake of new technologies, particularly in terms of the impact this has had on communication; and
- The dilution of both academic culture and common purpose.

Within the context of these exogenous pressures for change, the contemporary university is required to develop strategies on how to engage with those outside of the university in order to ameliorate the effects of external pressures as the university adapts or conforms to

the expectations of external constituents. That higher education is undergoing a period of intense pressure to change is neither a contested nor a revelatory statement. Nor is it true that universities have not had to face external pressures in the past. What is contested is the process by which these contemporary pressures will transform universities as we know them.

Among the constellation of contemporary environmental pressures is the 'growing requirement to pursue, warrant and improve quality, effectiveness, efficiency and responsiveness in all the strategic higher education activities (didactic, research, curricula innovation, staff and budgeting)' (Vaira 2004: 490). If engagement with those external to the university is assumed to be inherent in the notion of a responsive university, and if engagement has become a more formalised requirement of the contemporary university, then the extent and form of its incorporation into the university will inevitably be shaped by and depend on adaptive strategies at organisational level. As Muller (2003) cautions: it would be erroneous to conclude that the market is the only directive power; it is equally important to consider the contribution of the universities themselves (endogenous factors) to facilitate or resist external directive power (exogenous factors).

The claim that higher education – with its long history and established values and norms – constitutes an institution identifies a critical organisational-level contextual dimension that determines how a university as organisation responds to external demands (Higgins 2007; Meyer et al. 2007; Muller 2003, 2005; Oliver 1991; Scott 2001). Most importantly, it is a reminder of the university as institution, which may dictate the success of adaptive strategies within the university as organisation. In addition, consideration needs to be given to the distribution of power in universities, particularly the fact that in many university systems power still vests with academics rather than with those tasked with managing the university. If external pressures for an engaged university are acceded to at management level within the organisation, there may nevertheless be resistance to the acceptance and integration of engagement at other organisational levels, if engagement is interpreted to be in conflict with the values, norms and beliefs of the university as part of the institution of higher education.

Stakeholders and communities

The pressures referred to above have the inherent danger of tending towards abstraction. They are not the kind of pressures that, at the level of interpretation, translate directly into action. One cannot, for example, imagine a vice-chancellor or dean explaining that they took a particular course of action in response to globalisation.

Social change is interpreted by various agents belonging to a diverse set of social groupings and these groups apply pressure for change. In the case of higher education, such pressures are exerted by relevant individuals or groups, most often referred to as 'stakeholders', 'constituents' or 'communities'. Stakeholders may include students, staff (academic, administrative and management), alumni, professional bodies, firms, labour unions, social movements, civil society organisations, donor agencies and government (including its agencies) (Jongbloed et al.

2008). These groups are engaged in a mutually beneficial exchange or transactional relationship with the higher education system as a whole or with a particular university. Stakeholders may be internal or external to the university and, with the advent of information technologies, are no longer required to be in close proximity to the university. As such, the power or influence of stakeholders is no longer spatially bound.

Implicit in the corporate origins of the term 'stakeholder', and key to understanding the pressures exerted by stakeholders, is the fact that stakeholders 'participate in higher education institutions' decision-making as representatives of external society' (ibid.: 5). This forges an inexorable link between issues surrounding engagement and stakeholders, particularly in terms of how the university manages its relationship with an ever-increasing constituency of stakeholders (Brennan 2008), and which stakeholders are ultimately prioritised and engaged with (Singh in Kruss 2003). Such a process of 'stakeholder management' determines how and with whom a university chooses to engage.

It is also important to keep in mind that the constant interpretation and management of stakeholder demands in a changing social context must be understood within the enduring, steady state of rules, procedures, norms and beliefs that constitute the university. As Brennan (2008: 383) states:

> *In pointing up some of the major social, economic and political changes which characterise the modern world, it is important not to make a priori assumptions about responsiveness and change within higher education. While these changes in higher education's global and local environments may be expected to almost certainly provoke changes … its traditional autonomies are not necessarily lost overnight and it remains an empirical question as to how far higher education does actually change.*

Academic core and third mission

From a research perspective, the key question that this study seeks to answer is: How are academics at African universities negotiating the tension between engaging with those external to the academy and strengthening the core functions of the university? Implicit in this question is a theory of knowledge transfer between the university and prospective knowledge consumers – transfer that ultimately feeds into innovation and development. This link between knowledge and development is central to an appreciation of why a strong academic core is critical to the university's ability to contribute to development. As Cloete et al. (2011: 12) state: 'As a core knowledge institution, the university can only participate in the global knowledge economy and make a sustainable contribution to development if its academic core is quantitatively and qualitatively strong.'

Key to the relationship between higher education and development is the establishment of a productive relationship between knowledge and university engagement activities. If there is

an overemphasis on the basic knowledge activities of teaching and research – in other words, a predominantly inward orientation towards strengthening the academic core – the university becomes disconnected from the needs of society. However, an overemphasis on connecting to those external to the university through engagement activities potentially weakens the academic core, and the university has little new or relevant knowledge to offer in a bidirectional exchange relationship. As academics engage with those external to the university, a fundamental question therefore needs to be raised: To what extent do these engagement activities link to the core technologies of the university? The challenge for universities, then, is to deal with this inherent tension between 'buffering' (protecting) the core technologies of the institution and 'bridging' (linking) those with external actors (Scott 2001: 199–211).

There are those who will claim that the third mission of universities (i.e. providing services to the communities – broadly conceived to include industry – in which they are embedded) is, in fact, a core function of universities. The work of Etzkowitz and Leydsdorff and their concept of the 'triple helix' is often cited as providing a model in which research, teaching and service are inseparable (Anderson 2001; Benner & Sandstrom 2000; Jongbloed et al. 2008). While third-mission activities in contemporary universities may well be commonplace and perhaps even inescapable, it is still both conceivable and possible for these activities to be performed by organisations external to the university. Civil society organisations, government agencies, corporate social responsibility departments, as well as organisational structures created at the periphery of the university, are all capable of delivering third mission-type services to communities. Not so in the case of knowledge creation and, in particular, knowledge validation and accreditation, which remain the guarded preserve of the academy (Muller & Cloete 1986).

Engagement as (inter)connectedness

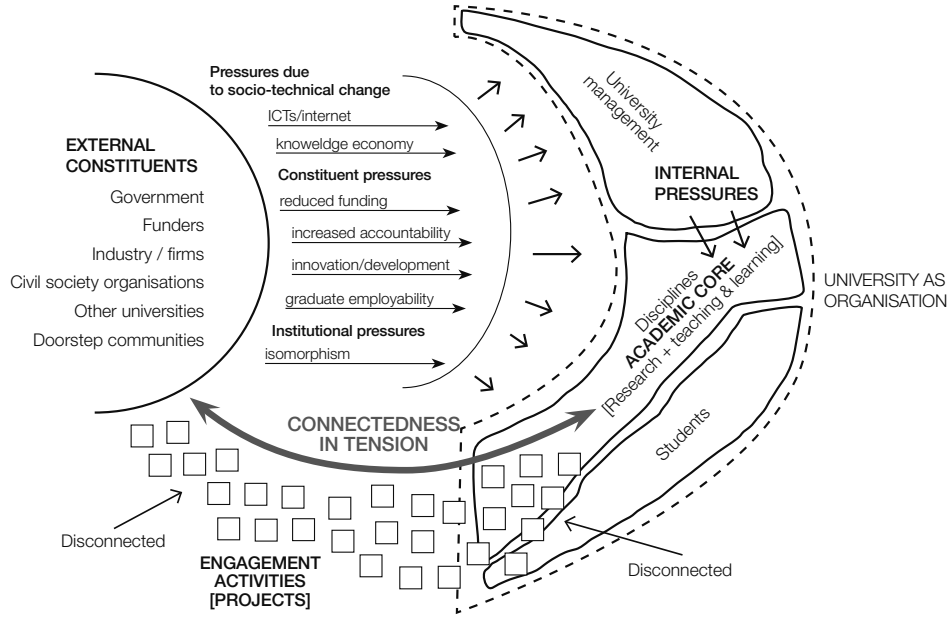
For the purposes of this study, engagement is understood to mean formalised activities where academics and/or students engage with those external to the university for the purported mutual benefit of the community and the academic enterprise in order to develop society at large. This definition is deliberately as broad as possible as its intention is to capture all types of engagement activities, of which, as highlighted earlier, there are many (e.g. service learning, outreach, community engagement, scholarly engagement, university-industry linkages, third mission and the popularisation of science). This study did not seek to type engagement activities; rather, the intention was to capture as many and as broad a possible range of university engagement activities in order to gain some insights into how each engagement activity links to the academic core and how they are articulated.

Given that firstly, the concept of engagement is highly contextual and ideologically embedded (see Muller 2010; Van Schalkwyk 2011), and therefore problematic when attempts are made to quantify or qualify engagement-like activities across universities, and that secondly, an empirically grounded notion is sought to operationalise research on how certain academic activities are positioned on the periphery–core continuum, the concept of 'connectedness'

offers a way out of the ideological quagmire. 'Connectedness' is operationalised along two dimensions, namely the extent to which *academic activities strengthen or weaken the academic core*, and the extent to which engagement activities *align themselves with policy priorities, ensure their financial sustainability, and connect to innovation/application agents* ('articulation'). Activities that strengthen the academic core and are highly articulated are described as 'interconnected' to indicate that they are well connected to both external and internal constituencies, and are in alignment with the policies and values of both. Conversely, activities that are closely linked to external constituents but weaken the academic core and are poorly articulated are described as 'disconnected'.[2] Creating this continuum of connectedness, which extends from interconnected to disconnected, provides the basis for the quantification of engagement activities.

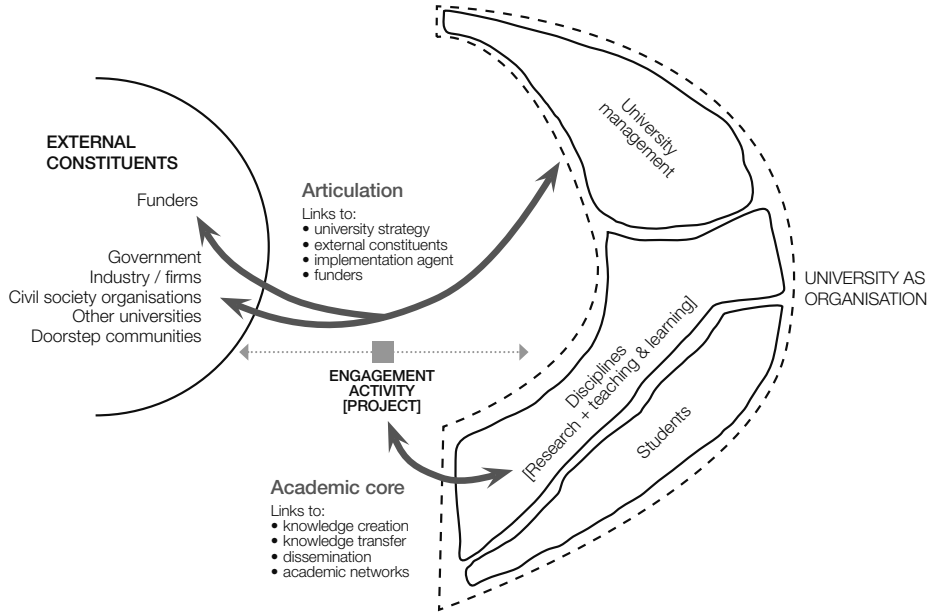
Figure 10.1 illustrates the pressures, both external and internal, exerted on academics and the external constituents with whom they may elect to engage in order to alleviate some of these pressures. The liminal space between the university and external constituents is shown to be populated by a variety of engagement activities, each occupying a position along a continuum of interconnectedness. Figure 10.2 illustrates articulation and linking to the academic core as dimensions of interconnectedness.

Figure 10.1 Engagement as connectedness between external constituents and the academic core



2 Activities linked closely to internal constituents (i.e. other academics) and that include no external linkages could also be described as disconnected; however, such activities are not engagement activities according to the definition of engagement adopted in this study.

Figure 10.2 Articulation and linking to the academic core as dimensions of interconnectedness



Research design

This research project used a set of indicators to assess the interconnectedness of university engagement activities. Indicators are a means of quantifying the complex properties or states of social arrangements, such as organisations (including universities). Indicators may reflect a property or particular state – either at a specific point in time or as these properties and states change over time. These properties or states are subject to the influence of extraneous conditions.

Indicators of interconnectedness

Previous studies have attempted to quantify the engagement activities of academics and universities. For instance, Jensen et al. (2008) developed individual-level indicators to investigate the correlation between the research performance of researchers and their popularisation activities (i.e. how active they are in communicating scientific knowledge to a wide, non-specialised audience). Neresini and Bucchi (2011) developed a set of organisational-level indicators to assess whether what they call 'public engagement' activities are being integrated into the institutional culture of European research institutions. Public engagement refers mainly to the communication of science to the public; that is, the sharing of existing expert knowledge with non-experts. The HERANA Phase 1 project (Cloete et al. 2011) focused on

projects and centres rather than on individuals or organisations. In addition, there was a shift in the focus on knowledge production: whereas the European studies seemed to be concerned with the dissemination of knowledge post-production with those outside of the university, the HERANA 1 research was concerned with the application of existing knowledge and the creation of new knowledge in exchanges between academics and those external to the university.

Certain limitations exist in the HERANA 1 data that precluded it from providing a more detailed picture of the universe of engagement activities at a particular university; namely, being able to differentiate between projects in different academic disciplines and between projects of different durations. Both disciplinary field and temporality are taken to be variables that either have the potential to impact a project's interconnectedness or are claimed to be mitigating factors in a project's interconnectedness. In this regard, Muller (2003) cautions that the propensity to engage may well be a function of a particular discipline's knowledge creation cycle; in particular, the period and possibility of making the transition from basic to applied knowledge. Following Clark's (1983) conception of the independence of the disciplines from one another for their survival, it is conceivable that engagement may prevail and thrive within one discipline without any impact on another discipline. The inclusion of disciplinary differentiation across projects would therefore not only provide an indication of which disciplines are finding it more difficult to engage in a sustainable manner, but also highlight projects that are engaging successfully despite the perceived barriers inherent in their discipline.

The HERANA 1 sample included activities that assumed a variety of structural arrangements including projects, programmes and centres. Each arrangement seems to infer a different temporal dimension to the activity in question and may result in differing levels of articulation and bearing on core activities. For example, 'projects' appear to be shorter, one-off activities and the 'projectisation' of engagement activities (often driven by funders and funding) may certainly place limits on the sustained impact on the academic core that a particular engagement activity may have. A temporal dimension indicating the duration of an engagement activity could provide a useful picture in terms of the sustained impact on knowledge creation that a particular activity may have. It could also provide some evidence of a possible correlation between more enduring activities (i.e. those that are more programmatic) and the extent to which such activities strengthen the academic core. Data on the duration of engagement projects were therefore collected.

In addition, data on whether a project was complete or ongoing were deemed to be of relevance. Links to the academic core can be protracted as they depend on research being finalised and on knowledge being vetted. The implication of any lags is that early-phase projects may well score poorly in terms of their interconnectedness owing to a low academic core rating. Such projects nevertheless retain the potential to link to the academic core as the project matures. It was therefore deemed important to be able to differentiate between those projects that are complete and those projects that are ongoing.

Operationalising 'interconnectedness'

As highlighted earlier, 'interconnectedness' was operationalised along two dimensions. The first dimension is 'articulation', which has a number of characteristics. Firstly, articulation includes the extent to which the aims and outcomes of engagement activities articulate with the university's strategic objectives. Secondly, articulation includes the linkages engagement activities have with external stakeholders such as government, industry, small businesses, non-governmental organisations and others. Another link is the extent to which there are connections with an 'implementation agency' (i.e. an external body that takes up the knowledge and/or its products generated or applied through research or training). Thirdly, articulation takes into account linkages generated through sources of funding in three respects: whether the engagement activity has obtained external funding; the number of funding sources secured; and the extent to which the project has developed a relationship with its funders over time. The second dimension of interconnectedness incorporates the extent to which engagement activities serve to strengthen the academic core of the university. This includes the extent to which the engagement activity generates new knowledge (versus applying existing knowledge); feeds into teaching or curriculum development; is linked to the formal training of students; enables academics to disseminate their research; and is linked to international academic networks.

The various aspects relating to 'articulation' and 'strengthening the academic core' were converted into a set of eight indicators that could then be applied to an analysis of the engagement activities included in the study. Four indicators were developed for each of the dimensions to ensure an equal weighting between the articulation and the academic core indicators. A maximum score of 2.0 was assigned to each of three articulation indicators and to each of three academic core indicators, and a maximum score of 1.0 to one articulation indicator and to one academic core indicator. Each dimension could therefore score a maximum of 9.0 by adding up the scores of each of the four indicators for each dimension. On the basis of the indicator score totals for articulation and for the academic core, the projects were plotted on a graph depicting the intersection between 'articulation' and 'strengthening the academic core' in order to provide a graphic representation of the extent of each project's interconnectedness. Interconnectedness is represented on a third axis, which bisects the articulation and academic core quadrants, and which ranges from disconnected (-9) to interconnected (9). An engagement activity's interconnectedness score is calculated by halving the sum of the articulation and the academic core values for each engagement activity. Table 10.1 provides a full list of indicators, a brief description of each indicator and the score assigned to each of the indicators.[3]

3 A full description of each of the indicators is given in the research report of this study, which is available at http://www.chet.org.za/papers/engagement-interconnectedness.

Table 10.1 Indicators of interconnectedness and scores per indicator

	Articulation indicators	Reference	Score	Max score
A1	Alignment between project and university strategic objectives	A1.1 A1.2 A1.3	For each project objective in alignment with university mission/vision = 0.25	1.0
A2	Initiation/agenda-setting	A2.1	Self-initiated = 1	1.0
		A2.2	Proposal more than one author = 0.5	0.5
		A2.3	Project plan/terms of reference flexible = 1	1.0
		A2.7	Advisory group and meets at least once per annum = 0.5	0.5
A3	Links to external stakeholders (non-academic) and to implementation agencies	A2.6 A3.1.2	For each link to an external stakeholder = 0.25 (max = 1)	1.0
		A3.2 A3.3 A3.4	Direct link to implementation agency = 2 OR Indirect link to implementation agency = 1 OR Self-implemented = 1	2.0
A4	Funding	A4.1	For each source of funding = 0.25 (max = 1)	1.0
		A4.1	Long-term funding (more than three years) = 0.5	0.5
		A4.1	Renewable funding (at least one source) = 0.5	0.5

	Academic core indicators	Reference	Score	Max score
C1	Generates new knowledge or product	C1.1	New knowledge or product = 1.25 OR New data = 0.5	1.25
		A1.4 C1.2.5	Publicly available = 0.25	0.25
		C2.1 C2.3.2 A1.4	PhDs linked to project = 0.5	0.5
C2	Dissemination	C1.2.2 C1.2.3 C1.2.4 C1.2.6 C1.2.7 C1.2.8 C1.2.9	For each publication/presentation listed = 0.25	2.0
C3a	Teaching/curriculum development	C2.1 C2.2	Changes to courses/modules = 1 OR New courses/modules/programmes = 2	2.0
C3b	Formal teaching/learning of students	C2.3.1 C2.3.2	Students involved = 0.5	0.5
		C2.4	Participation in project is course requirement = 1	1.0
		C2.5 C2.6 C2.7 C2.8	Other roles for students in project = 0.25 per role	0.5
C4	Links to academic networks	A3.1.1	Links to academics from other universities = 1	1.0

Method

This study set out to ensure a larger, more equally distributed set of engagement activities in its sample than was the case in the HERANA Phase 1 project. Ideally, a large and randomly selected sample of university engagement activities would need to be generated in order to negate the effects of selection bias. For such a selection process to be a realistic option, universities would need to be in a position to provide comprehensive lists of all engagement activities. Universities are not, however, in a position to do so. It is for this reason that Kruss et al. (2012) resorted to surveying all academics at the universities participating in their study. While this study succeeded in collecting data from a much larger sample of engagement activities, the selection of engagement activities was still left in the hands of the participating universities.

To ensure that the engagement activities in the sample were comparable, stringent selection criteria were drawn up. The unit of analysis was more clearly defined by providing a clear and unambiguous set of criteria for the kind of activities to be included in the sample. This provided the assurance that all activities included in the sample were *engagement* projects and of a *similar* structural type. A working definition of what constitutes an engagement activity was formulated and provided to each project leader on the cover sheet of the questionnaire distributed. The definition provided read as follows: 'Engagement activities are understood to be activities where academics or students engage with those external to the university for the purported benefit of both the community and the academic enterprise.' In addition to the definition, the unit of analysis was clearly stipulated on the cover page. The requirement for the inclusion of an engagement activity in the sample was that it should constitute the smallest unit of coordinated activity, with formal links to a faculty and consisting of at least one full-time academic. This focus on the 'smallest unit' allowed for the inclusion of both projects and programmes, but prevented multi-project programmes or the activities of entire research units/centres from being included in the sample.

Two universities were included in the Phase 2 research – Nelson Mandela Metropolitan University (NMMU) located in Port Elizabeth, South Africa, and Makerere University located in Kampala, Uganda.[4]

NMMU was selected because it was found to contain several exemplary engagement activities identified in the HERANA 1 project. The intention was to interrogate these exemplary activities using the refined Phase 2 methodology. In addition, NMMU makes for an interesting case because it is a so-called 'comprehensive' university – a university type created following the merger of a technical university with a research university. Each of these pre-merger university types engenders a different proximity to those external to the university. Technical universities (or 'technikons' as they were known in South Africa), with their emphasis on vocational training, enjoyed a closer working relationship with industry. Research universities, on the

4 Note: the NMMU was selected for inclusion in this particular study, rather than the University of Cape Town (which is the South African flagship university in the HERANA group of institutions included in HERANA Phase 2), because this study sought to build on the data and methodology developed in HERANA Phase 1, which included the NMMU and not the University of Cape Town.

other hand, as a general rule, were more used to setting their own agenda, relatively unaffected by demands made by those external to the university. As a comprehensive university, NMMU therefore provided an interesting mix of those familiar with and those foreign to frequent engagement with external stakeholders. Embedded in this mix is an enduring commitment by the university leadership to the 'scholarship of engagement'. This commitment finds structural expression in the form of the university's dedicated engagement unit, the Centre for Academic Engagement and Collaboration.

Makerere University is regarded as Uganda's national flagship and premier research university. Research shows that compared to other African flagship universities, Makerere has shown a marked increase in recent years in its research output, both in terms of publications and in terms of doctoral graduates (Bunting et al. 2014). At the same time, Makerere relies heavily on donor funding to support its research activities (Makerere University 2013). This combination of an increase in research output and a reliance on donor funding makes Makerere a potentially interesting case from the point of view of using the methodology to establish whether donor-funded engagement activities are contributing their share to the increase in research outputs, and whether academics at Makerere involved in such engagement activities can therefore be described as interconnected.

At each of the universities, two faculties (or colleges in the case of Makerere) from which to collect data were identified: one faculty or college more likely to be engaged and a second faculty or college perceived to be less likely to be engaged (see earlier discussion on possible disciplinary differences). In the case of NMMU, the Faculty of Science and the Faculty of Arts were identified. At Makerere, the College of the Humanities and Social Sciences and the College of Agriculture and Environmental Science were identified. At both universities, a target of 30 completed questionnaires was set. Because the study was intent on collecting a large sample, some flexibility was permitted in collecting data from other faculties or colleges in order to ensure a larger sample. A total of 22 valid questionnaires were returned at Makerere and 77 at NMMU.

While the working definition of engagement makes provision for both students and academics as potential actors engaging with those external to the university, the project approached only university academics who had led or who were leading engagement projects at the time the questionnaire was administered. Project leaders were taken to be representative of their project's engagement activities, and were regarded as the likely transitional locus between the engagement activities for which they assume responsibility and the core technologies of teaching and research.

In order to ensure greater consistency in the data collected, a structured questionnaire was developed. Questionnaires collected data in three parts: Part A collected data on project leaders (including their position at the university and the number of projects they were leading and involved in); Part B collected indicator data on a single engagement project selected by the project leader; and Part C collected data on project leaders' perceptions of university engagement in relation to the goals of being an engaged academic, how

the university supports or hinders engagement, and the future of university engagement activities. Questionnaires were distributed electronically and in hard copy to engagement project leaders with follow-up interviews for clarification where necessary. Following approval from the research ethics committee (in the case of NMMU), data collection was done by the universities themselves. At NMMU, data was collected by the Director of the Centre for Academic Engagement and Collaboration, while at Makerere data was collected by the university's Quality Assurance Directorate.

Limitations of this study

Both impact and quality are notoriously difficult to quantify in an objective fashion, devoid of the influence of those with vested interests (such as funders and publishers, to name but two). The method proposed in this study does not in any way claim to capture or reflect the impact of engagement activities on those constituents with whom academics elect to engage. In this sense, impact is only measured in one direction: that is, on the university. It is conceivable that projects that score low in terms of the extent to which they strengthen the academic core may nevertheless have a meaningful and positive impact on a particular community. To assess such impact, a separate set of indicators from those proposed here would have to be developed.

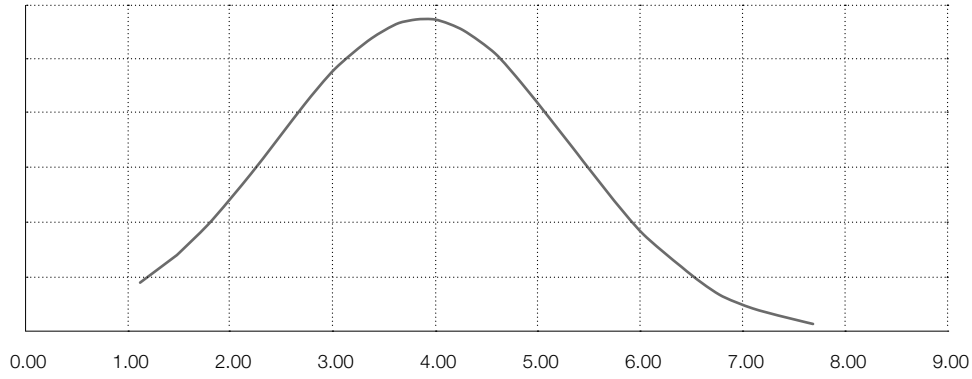
The proposed method also does not purport to capture the quality of the academic outputs of the engagement projects when assessing links to the academic core in the form of knowledge products such as publications, or in the form of changes to teaching and learning. All outputs are equally weighted, regardless of the type of output, the journal and its impact factor, or the publisher of the output. Similarly, for teaching and learning, no assessment is made of the quality of any changes introduced as a result of an engagement activity. The only requirement is that a link exists between the academic output and the act of engaging with those from outside of the university. Modifications could easily be made to this instrument should anyone wish to assign weighted values to a range of possible academic outputs.

Findings and discussion[5]

The indicators of engagement as interconnectedness captured variance in the interconnectedness of university engagement activities. Some engagement activities returned a high score based on the indicators used and can therefore be described as interconnected, while others returned a low score and can therefore be described as disconnected. The distribution of scores for all 99 engagement activities are shown in Figure 10.3.

5 The full dataset from this study is available as open data from http://dx.doi.org/10.7910/DVN/27507

Figure 10.3 The distribution of interconnectedness scores at two universities (n=99)



The articulation, academic core and interconnectedness scores for engagement activities at the two institutions are presented in Figures 10.4 and 10.5. The extent to which each engagement activity can be said to be articulated, and the extent to which each activity links to the academic core, is presented in graphic form, creating an institution-wide snapshot of the university's engagement activities.

Figure 10.4 shows that engagement projects at Makerere are fairly evenly spread out across the middle of the connectedness spectrum. Projects from the sample located in the College of the Humanities and Social Sciences and the College of Agricultural and Environmental Sciences appear to be the most successful in mediating the tension between linking both externally and with the academic core. Projects located in the College of Veterinary Medicine, Animal Resources and Bio-security and, to a lesser extent, the College of Computing and Information Science, appear to be struggling to link their engagement activities to the academic core of the university.

At NMMU, Figure 10.5 shows that the Faculties of the Arts and of Engineering were doing best in managing the tension between engaging externally and strengthening the core. While the Faculty of Health has some projects higher up in the cluster of projects in terms of being interconnected, it also has five projects (mainly from the Department of Nursing) that populate the disconnected end of the spectrum, mainly owing to poor academic core ratings. These same five projects also fare poorly in terms of their articulation.

Of interest at NMMU is how the engagement projects located in two extension units in the Faculties of Science and in Engineering (Innoventon and Entsa, respectively) compare with projects located in the parent faculties. In both cases, the engagement projects at Innoventon and Entsa score lower on the interconnectedness dimension than projects located in the faculties, although the Entsa projects still score relatively well compared to the broader population of engagement projects at NMMU. This would suggest that these extension units, set up to facilitate interaction between the university and external communities, were less successful in linking their activities back to core functions housed in their parent faculties.

Figure 10.4 The interconnectedness of engagement projects at Makerere University

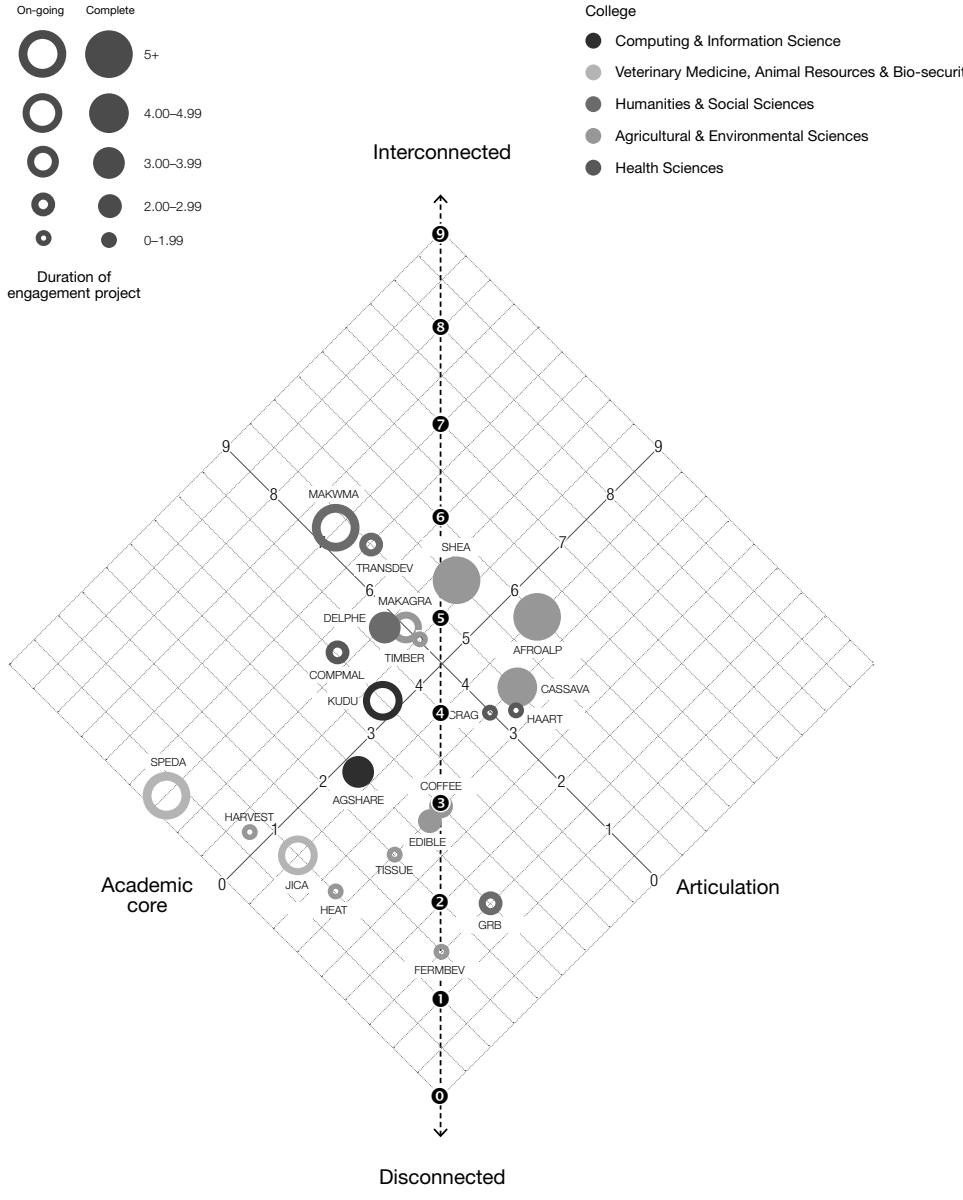
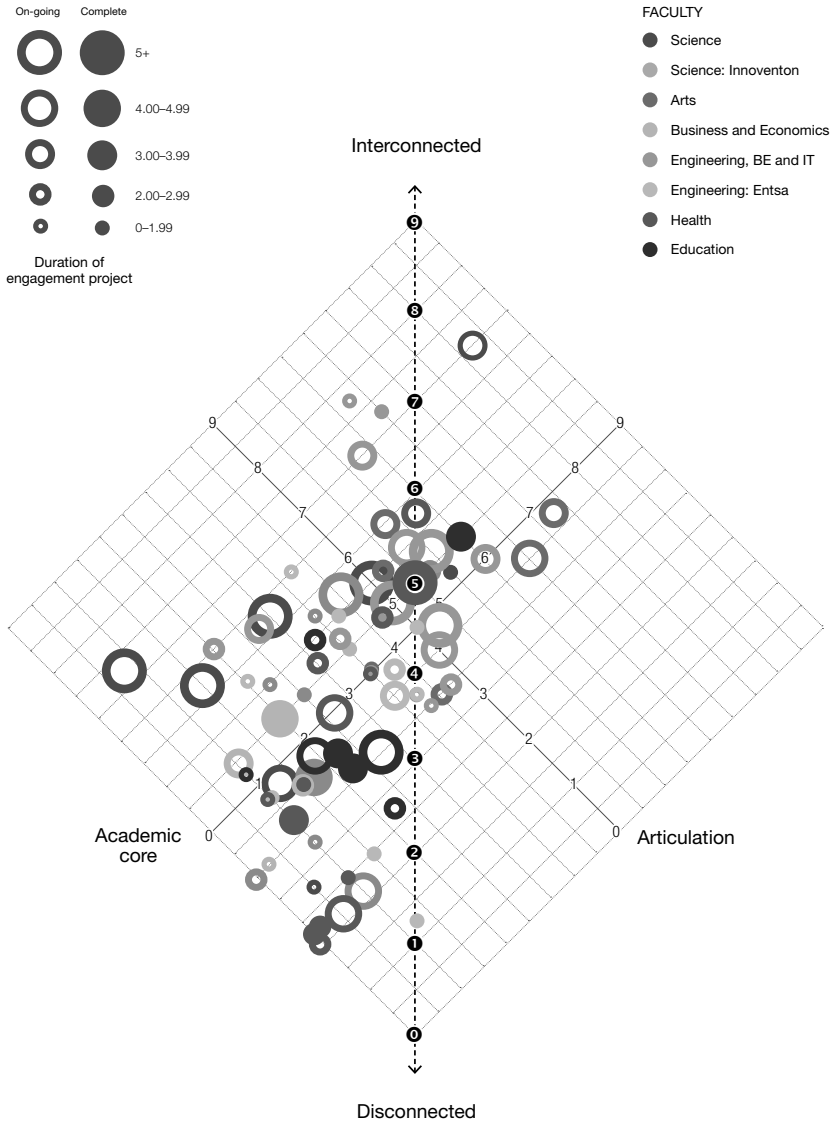


Figure 10.5 The interconnectedness of engagement projects at Nelson Mandela Metropolitan University



At both universities, engagement activities scored higher on the 'articulation' indicators than on the 'strengthening the academic core' indicators. A closer examination of the articulation scores reveals that engagement activities at both universities scored well in terms of the project initiation and agenda-setting indicators. However, on average, projects scored relatively poorly when it came to the other three articulation indicators.

At both universities, engagement activity scores were low in terms of their links to specific institutional strategic objectives, as expressed in each university's mission and vision statements. At NMMU, the data shows that projects mostly linked to between one and three of the institutional objectives, most often to NMMU's commitment to regional development. By contrast, the data shows that the objective relating to NMMU's Africa and global development mission was consistently absent from the objectives of the university's engagement projects. An analysis of funding sources (see Figure 10.6) shows that firms located in the region, as well as funding from the province and the city, made up the bulk of the project funds at NMMU. It would appear, therefore, that for project leaders the local reality in which a project operates trumps the continental and global aspirations of the university. In the case of Makerere, the data shows that, on average, projects linked to at least two of the university's strategic objectives. As in the case of NMMU, responsiveness to global needs was very rarely cited as a project objective, and most projects indicated an aspiration to respond to national needs (rather than regional needs, as was found to be the case at NMMU). Unlike NMMU, though, projects at Makerere relied more heavily on funds from foreign donors, with limited funding from government and from industry (see Figure 10.6). Perhaps the fact that NMMU is regionally focused while Makerere is nationally focused is unsurprising given Makerere's position as a national flagship university, while NMMU is seen to fulfil an important regional role within the national higher education system.

In the case of external linkages, the scores indicate that, on average, projects linked to only one external constituent other than the project's funders.

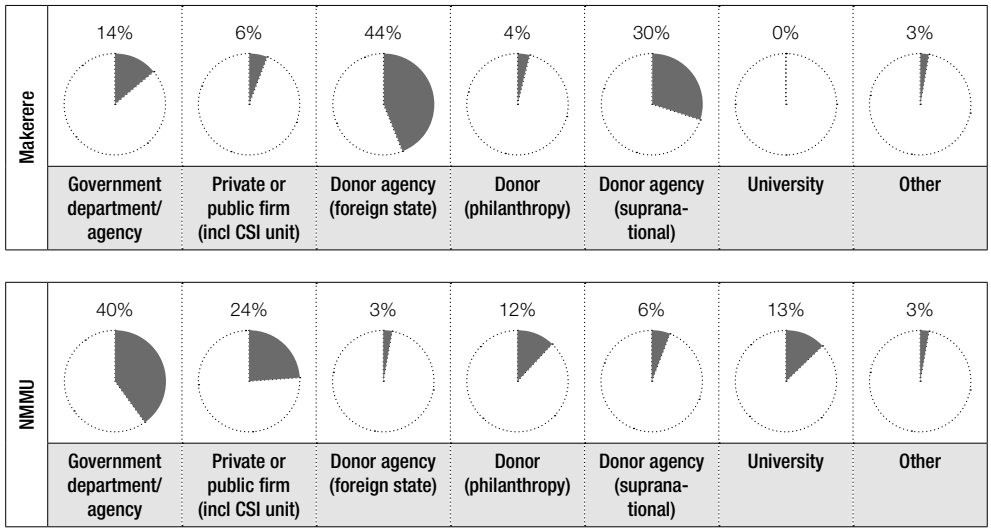
The academic core indicators reveal which projects are high producers in terms of the production, transfer and dissemination of *new* knowledge. From a different vantage point, the academic core indicators also reveal which projects are not linking the knowledge created (assuming such knowledge has indeed been created) to the academic core, even if they are engaging successfully with those external to the university. This makes it possible to examine why such projects are not linking to the academic core in attempts to uncover blockages in, or even resistance to, creating such linkages.

At Makerere, projects scored relatively well in terms of knowledge creation, public availability of knowledge and linking to PhD programmes. Projects at Makerere scored less well in terms of how they linked to teaching and learning. Of concern at NMMU is the fact that, on average, projects did not generate new knowledge. Weighing down NMMU's score to some extent is the fact that much of the knowledge created by its projects was not publicly available. In particular, many projects (24%) at NMMU received funding from industry, which results in embargos being placed on the dissemination of knowledge that is taken to be proprietary. Makerere, in contrast, scores much better on the public availability of knowledge. And, in the case of Makerere, funding came predominantly from foreign donors (78%) that prize openness and accessibility of knowledge (see Figure 10.6).

Several observations can be made in this regard. Firstly, with some exceptions, projects that scored lower on the academic core indicators tended to be projects that were ongoing

rather than complete. Certainly in the case of Makerere, it is evident that completed projects scored better on the connectedness axis than did ongoing projects. In fact, the samples at both universities tended to have a preponderance of ongoing projects rather than completed projects. Given that many of the engagement activities in the sample were still in the early phases, they have the potential to score more highly on the academic core indicators as they mature. This highlights the importance of not only producing snapshots of university engagement activities at a particular moment in time, but also of tracking engagement activities over a period of time in order to observe possible improvements in linking to the core functions of the university.

Figure 10.6 Weighted proportional funding sources of engagement projects



Source: Van Schalkwyk (2014)

The aggregation of scores across an institution provides some insight into *general* areas where there is room for improved linkages – either externally, or to the strategy of the university, or to the core technologies of the university. However, aggregation can mask both strengths and weaknesses of *specific* projects and lose the insights to be gained from how projects in different disciplines, or of different durations, interconnect.

While very few projects at either university scored well on the academic core indicators, it is possible that some projects may choose to focus exclusively on research or exclusively on teaching and learning.

An argument could be put forward that research, and the natural outcome of such research (i.e. new knowledge), is the only imperative for any university academic – be they engaged or

otherwise – and that everything else, including teaching, follows. This stance challenges the inclusion of teaching and learning as an equally weighted contributor to the academic core. The knowledge creation imperative is not disputed; however, conceiving of the knowledge creation and transfer process as one that is unitary is contested. In a differentiated process, it is conceivable that specialisation occurs, with different actors playing different roles at various stages in the knowledge creation and transfer process. Knowledge creation remains a critical and non-negotiable first step in this process, but it seems possible to conceive of a process in which certain academics specialise in knowledge creation while others specialise in knowledge transfer (including teaching and even application). That those with specialist roles in the knowledge creation and transfer process are linked together is essential in ensuring an uninterrupted flow in the process.

The method presented here captures engagement projects that embody a unitary process of knowledge creation, transfer and application, and rewards such projects with a high academic core score. As such, the method offers a mechanism for monitoring the mix of research- versus teaching-only engagement projects. From a systemic perspective, the methodology could be used across multiple universities in a single system or between different sectors of a national post-school system to ensure a mix of research- and teaching-only institutions, assuming that links exist between institutions for the transfer of new knowledge. From an organisational perspective, a university structure (e.g. a centre or unit) could take a differentiated approach to how its projects connect to the academic core. If this differentiated approach is one that is coordinated and managed, then it is possible that none of the projects may score well individually but that the centre as a whole may well do so. In other words, the sum of the parts should be taken into consideration before dismissing a coordinated cluster of projects as limited in their links to the academic core. As highlighted earlier, NMMU is a comprehensive university (i.e. a mix of both a research- and a teaching-intensive university). It is therefore not surprising to find a mix of both teaching- and research-focused projects. As Uganda's flagship university and with a clear commitment to becoming a leading research university in Africa, it is perhaps not surprising that projects at Makerere show a strong leaning towards engagement linked to research.

Based on an examination of NMMU's interconnectedness graphic (see Figure 10.7a below), it becomes apparent from the pyramid-shaped distribution of the engagement activities on the academic core axis that the majority of the projects are not strengthening the academic core. As a comprehensive university, with engagement activities that link both to research and teaching, one would expect a more rectangular distribution of activities on the chart (see Figure 10.7b).

The shaded area in Figure 10.7b is suggestive rather than prescriptive. It suggests an interconnectedness score of between 2.5 and 8.0, based on the anticipation that at NMMU, certain engagement activities that are of the outreach type, and may never exhibit strong links to the core functions of the university, will continue to be part of the university's engagement landscape.

Figure 10.7a Current shape of engagement activities at Nelson Mandela Metropolitan University

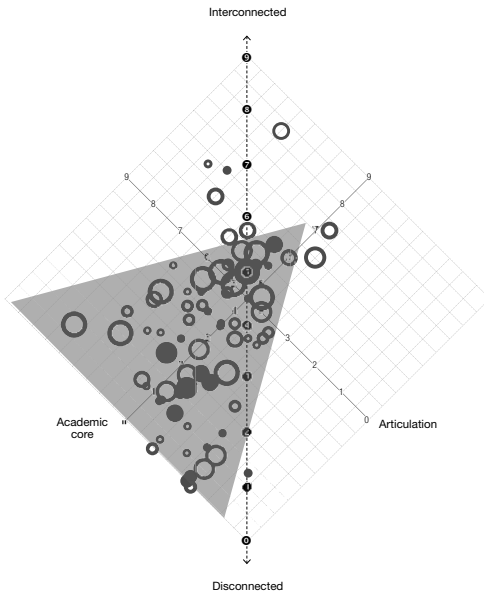
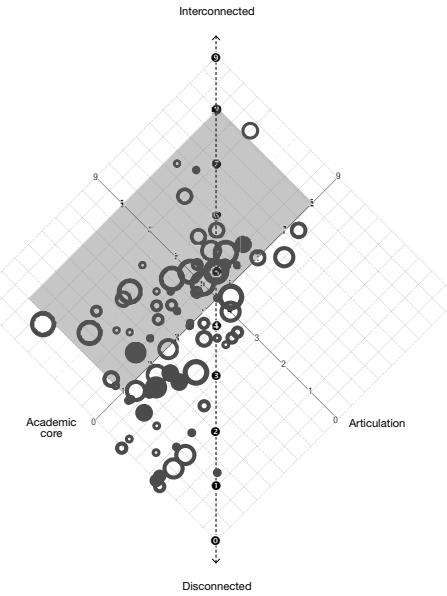


Figure 10.7b Proposed shape of engagement activities at a comprehensive university



Conclusion

The overarching objective of this research project was to examine how academics at African universities are negotiating the tension between engaging with those external to the university, on the one hand, and ensuring that their activities link to the core functions of the university, on the other, in a manner that is both sustainable and in alignment with the strategic objectives of the university.

It is has been shown that it is possible to develop a set of indicators to assess the extent to which university engagement activities are articulated and strengthening the core functions of universities. The concept of interconnectedness provides a useful framework for operationalising research on engagement activities. The project was able to assign an interconnectedness score to each engagement activity. The score denotes whether such activities can be described as interconnected (i.e. the activity effectively manages the tension between connecting to those outside of the university and with the core functions of the university), or whether such activities are disconnected (i.e. the activity is weakly connected to external communities or weakly connected to knowledge production and transfer). The

indicators and their graphical representation provide a useful tool for identifying patterns, and for revealing and confirming informative dimensions of university engagement activities at the two universities. Both universities have expressed interest in using the indicators to record, track and assess their engagement activities. Future advocacy work that will form part of HERANA Phase 3 will seek to promote a broader acceptance of this methodology at African universities. The research component of HERANA Phase 3 will further explore the usefulness of the indicators to universities, and work towards additional refinement and more automated data collection methods.

The indicators reveal a mixed picture at the two universities: in both cases there are exemplary projects that can be described as interconnected and there are also projects that are clearly disconnected. 'Articulation' scores at both universities were stronger than the 'strengthening the academic core' scores. However, the preponderance of engagement activities in the sample was ongoing and this creates the possibility of these activities' academic core ratings improving over time.

The interconnectedness of engagement activities also appeared to be in alignment with the institutional type and focus of the two universities. Engagement activities at NMMU, as a comprehensive university, showed more variation in the academic core scores, reflecting a mix of research with teaching and learning activities. There was also evidence of a strong residual culture of service learning and outreach-type engagement activities that fared poorly when it came to linking with research. On the other hand, at Makerere, with its drive to become a research-intensive university, there was evidence that engagement activities linked more consistently with research rather than with teaching and learning functions.

In Goldfinger, Bond is ultimately kept alive by his nemesis, despite the villain's initial posturing that 007 has nothing to offer him. Perhaps this is a tacit acknowledgement on the part of the villain that there is, after all, knowledge to be gained by keeping the intruder in one piece. At the very least, future engagement between Bond and Goldfinger remains a possibility. Similarly, this study suggests that engagement between university academics and those external to the university is active. The nature of this engagement, however, varies considerably. And, more portentously, based on the findings of this study, the degree to which such engagement activities can be said to be strengthening the African university as a key knowledge-producing institution is uneven and too frequently marginal.

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CHAPTER 11

STUDENT ENGAGEMENT AND CITIZENSHIP COMPETENCES IN AFRICAN UNIVERSITIES

Thierry M Luescher-Mamashela, Vincent Ssembatya, Edwina Brooks, Randall S Lange, Taabo Mugume and Samantha Richmond

The roles of higher education in a democratising society

Taking Castells' notion of development as a starting point, it is possible to appreciate the critical roles that universities play in the development of citizenship and democratic leadership in Africa. According to Castells (2014: 3), development is 'the self-defined process … by which humans, as a collective, enhance their wellbeing by creating the structural conditions for the expanded reproduction of the process of development itself.' As such, development involves a normative dimension that includes desirable values such as 'human rights, animal rights, equality, gender, empowerment and gender equality, solidarity, and the ability to live in a multicultural world ..., peace and democracy ... which includes and presupposes all other business of development' (ibid.: 6).

From a holistic perspective, the pursuit of social and economic development is necessarily linked to human development. Moreover, both are intrinsically linked to the capacity of the state which, as the key collective agency of development, is charged with creating the required structural conditions for development by means of different state initiatives and policies. The level of Africa's socio-economic development today must thus be understood as a function of the historical and current weakness of its states to act as development agency for the collective (ibid.: 16). Thus, *political* underdevelopment remains a key structural constraint undermining all other efforts at development. While there are, of course, variations between countries as to the extent to which African states are weak, corrupt, inefficient or even predatory (ibid.), what is important is to realise the interconnection between different elements of development and the primacy of politics. As Ghana's first president, Dr Kwame Nkrumah, famously argued: 'Seek ye first the political kingdom and all things shall be added unto you' (quoted in Mazrui 2001: 128).

Over the course of history, universities have played various roles in their contribution to political, social and economic development. While not all universities fulfil all functions, and individual universities combine and recombine them differently over their history, the university system of a country somehow has to combine all of them. The functions have historically been additive; flagship institutions in particular are expected to play multiple roles, which all involve elements of political socialisation. The first role is that of ideological apparatuses and producers of values and social legitimation. The second, which has been the domain of flagship and elite universities especially, is the selection and socialisation of elites and the formation of networks for their social cohesion. Third, universities play the crucial role of high-level skills training, which includes the highly-skilled labour force necessary to run the complex institutions of modern society, such as institutions of modern democracy, other state institutions and civil society organisations. And finally, there is universities' role in producing new knowledge, whereby the socio-economic and political conditions are of major importance to create the structural conditions for development (Castells 2009). In order to be able to fulfil these roles, universities have to be connected simultaneously to the information economy and to the socio-cultural challenges the society is undergoing (see Chapter 1).

In political development, democratisation and the consolidation and sustainability of democracy, education has a special role with respect to political socialisation. In this, universities have been central in the process of shaping civic values, constructing a new basis of belonging and citizenship, educating citizen leaders (Pascarella & Terenzini 2005), as well as 'making possible equal opportunities for people', even in the socio-political realm (Castells 2009). The notion of 'elite' socialisation has a different meaning in a democratising society in that from a democratic perspective – however utopian the democratic ideal – it is inclusive: any citizen is potentially a citizen leader and member of the political 'elite'. The imperfection of political reality in the existing democracies of our time is not to distract from this fundamentally egalitarian political ideal.

With respect to these functions, citizenship education is an essential part of contextually relevant education in democracies. It is premised on the complementarity of the notions that all individuals are entitled to human rights and all citizens are entitled to civil and political rights equally. In the words of UNESCO (2014: 1):

> *All forms of citizenship education inculcate (or aim at inculcating) respect for others and recognition of the equality of all human beings; and at combating all forms of discrimination (racist, gender-based, religious, etc.) by fostering a spirit of tolerance and peace among human beings. Thus when we speak of the purposes to be ascribed to either citizenship education (producing citizens with moral qualities) or human rights education (comprising a knowledge of the social and political rights of all human beings, and their recognition) we inevitably end up with the complementarity between citizenship and human rights.*

The purpose of citizenship education is therefore to further democracy by educating people about their rights and the principles and institutions that govern them; in exercising critical judgement; and in their sense of self and responsibility towards others and their community (UNESCO 2014). This is meant to apply at all levels of education. Yet, citizenship education is more widely studied as a role of general education than specifically in relation to higher education. Meanwhile, being placed at the apex of the education system, higher education has immense potential to contribute to the good of society by contributing to 'the production and consolidation of values – ethical values, personal values – and the formation of flexible personalities' (Castells 2009: 4).

Citizenship competences

The post-apartheid policy-based conception of higher education in South Africa illustrates the roles that education for citizenship can be ascribed to in transforming and democratising a society. The South African statutory advisory body to the Minister of Higher Education and Training averred in 2004 that (CHE 2004: 14):

> *Higher education is charged with developing a citizenry capable of participating effectively in democratic processes, and thus enhancing the project of democracy; with producing intellectuals who can engage with the most intractable problems of society and so develop more generally the ability of citizens to participate politically, economically and socially; and with producing high-level skilled graduates and new bases of knowledge to drive economic and social development, and to enhance the overall levels of intellectual and cultural development.*

Elaborating on these roles of higher education, Badat (2009: 8) emphasises the university's role in democracy and democratic citizenship arguing that:

> *… our societies require graduates who are not just capable professionals, but also sensitive intellectuals and critical citizens. Our academic programmes together with our institutional culture and practices must therefore ensure that we keep ethical questions in sharp focus, and that we advance a democratic ethos and a culture of human rights conducive to critical discourse, cultural tolerance, and a common commitment to a humane, just, non-racist and non-sexist social order.*

Accordingly, Badat (ibid.: 7–8) argues that the 'cultivation of highly educated people' requires that teaching and learning programmes and qualifications take into account the background and social and educational experiences of students, along with 'the kinds of knowledge, competences, skills and attitudes that our graduates require to function in a rapidly changing society, continent and world', which includes the ability 'to think theoretically and

imaginatively; gather and analyse information with rigour; critique and construct alternatives and communicate effectively orally and in writing.'

Contextually relevant citizenship and civic leadership competences, such as those mentioned by Badat, are an important social outcome of higher education which, by extension, contributes to the deepening of democracy in Africa (Mattes & Luescher-Mamashela 2012). In keeping with Hoskins and Deakin Crick (2010: 122), the notion of competences generally refers to 'a complex combination of knowledge, skills, understanding, values, attitudes and desire.' Drawing on a range of definitions, citizenship competences include knowledge, skills, values and behavioural dimensions (AACU 2012: 4). Drawing further on the frameworks offered by the AACU (2012), Hoskins and Deakin Crick (2010) and others, key among these competences are:

- *Knowledge:* familiarity with issues of politics and public affairs; knowledge of democracy and other political systems; exposure to and meaningful interaction with 'others';
- *Skills:* critical thinking and reasoning skills; leadership, argumentation and presentation skills; ability to engage with international perspectives; diversity and social skills;
- *Values:* respect for freedom; open-mindedness and respect for others; responsibility towards others; appreciation of citizenship; and
- *Collective action:* integration of knowledge, skills and values; participation in political processes; collaboration with others in problem solving.

The notion of citizenship competences does not imply that a person who lacks certain competences should be excluded from citizenship; rather, higher levels of competence are pursued to enhance citizens' political efficacy.[1]

Previous research into the nexus between higher education and democracy showed that university-educated political leaders and citizens in Africa play a key role as 'institutionalisers' in the complex institutions of state and civil society that characterise modern democracy (Mattes & Mozaffar 2011). The ability to navigate such institutions and contribute to their consolidation therefore seems to be among the outcomes of the student experience of higher education. Previous studies by the Higher Education Research and Advocacy Network in Africa (HERANA) further showed high levels of criticalness among students in African flagship universities, with respect to their evaluation of the quality of democracy in their respective countries, and to very high levels of political engagement of students. While the studies generated important propositions towards further research, the data could not pinpoint specific aspects of the student experience of higher education that would explain these competences. Moreover, the student surveys conducted in the four African flagship universities

1 Political efficacy refers to individual citizens' sense of political self-competence and regime responsiveness (Finkel 1985). A classic distinction is between 'internal' political efficacy, which is defined as 'the sense of being capable of acting effectively in the political realm', and 'external' political efficacy, which refers to 'the belief that the authorities or regime is responsive to attempted influence' (ibid.: 892–893).

(i.e. the Universities of Botswana, Cape Town, Dar es Salaam and Nairobi) supported both an interpretation of the African university as 'political hothouse' as well as its potential of serving as effective 'training ground' for citizenship competences (Luescher-Mamashela et al. 2011).[2]

The student experience as student engagement

The theoretical framework guiding the analysis of the student experience for the HERANA Phase 2 student surveys draws on recent work centred on the construct of 'student engagement' (Kuh 2009a, 2009b). Student engagement has become one of the latest buzzwords of higher education research (Klemenčič 2013). In common language usage, the meanings of 'engagement' involve notions of commitment, reciprocity and agency. They range from a use that is largely synonymous with participation in an activity, to others that are more in keeping with the original French meaning of '*engagement*' as pledge, thus denoting a (personal) commitment and corresponding action to accomplish a (shared) outcome (such as being engaged to be married). While there are a variety of definitions of student engagement in the literature of higher education and institutional research, the more prevalent ones have become quite focused and technical. George Kuh, who is one of the most prolific authors on the topic, defines student engagement as follows (Kuh 2009b: 683): 'Student engagement represents the time and effort students devote to activities that are empirically linked to desired outcomes of college and what institutions do to induce students to participate in these activities.'

Student engagement therefore involves at least two agents in the pursuit of desired graduate outcomes: the individual student (as well as students' peers, friends and family) and the university (particularly academic and student affairs staff). Kuh's definition of student engagement is underpinned by a body of knowledge that has its roots in Tyler's work on time on task, Pace's work on quality of effort, Astin's theory of student involvement, Tinto's theory on social and academic integration, as well as more recent insights into student engagement gained by Kuh and others (see Kuh 2009a: 6). In the last three decades, studies building on this body of knowledge have shown robust relationships and correlations between 'students' investment of time, effort and interest in a range of educationally-orientated activities, and favourable outcomes such as increased performance, persistence and satisfaction' (Trowler & Trowler 2010: 7). Studies of student engagement show that apart from students' backgrounds, academic preparation and motivation, various components of student engagement offer the best predictors of student satisfaction and success in attaining desired graduate outcomes (Strydom & Mentz 2010: 3).[3]

The international knowledge base on student engagement and its positive impacts on student retention and success has grown tremendously in the past five years, spurred by the availability of massive amounts of data from regular student surveys. Best known are surveys

2 See also Kgosithebe (2014) and Mattes and Luescher-Mamashela (2012).

3 See also Kuh (2009b) and Pascarella and Terenzini (2005).

based on the widely used National Survey of Student Engagement developed in the United States and adaptions thereof in different contexts, such as the Australasian Survey of Student Engagement, the South African Survey of Student Engagement, and local versions in China, Turkey and other national and institutional settings (Strydom & Mentz 2010). Derivatives and independently developed surveys based on the same body of knowledge are done for students in different years of study (e.g. first-year entry surveys and senior-student surveys); students studying for different qualification levels (e.g. undergraduates and postgraduates); and students in different types of institutions (e.g. two-year colleges and research universities) (Kuh 2009a). The Student Experience in the Research University (SERU) survey, from which this study draws a number of constructs, is a student engagement survey developed by the Centre for Studies in Higher Education (CSHE) of the University of California, Berkeley, to study the undergraduate learning experience of students in research universities.

The first and most important purpose of surveys on student engagement is to 'provide high-quality, actionable data that institutions can use to improve the undergraduate experience' (ibid.: 9). Student engagement surveys allow institutional researchers to open the black box of student learning as student engagement indicators act as process indicators of the student experience (ibid.). The analyses of most studies that use the student engagement construct focus on aspects of teaching and learning (Kuh 2009a). Much less work is done on student engagement and the social outcomes of higher education. Among the few and notable exceptions is the work by Nida Denson on diversity-related student engagement, such as her study of the impact of student engagement with diversity on the development of graduate attributes (Denson & Zhang 2010).

The starting point for the student engagement surveys conducted in this HERANA Phase 2 project has been earlier work in HERANA Phase 1 into the nexus between higher education and democracy in Africa (see, for example, Luescher-Mamashela et al. 2011; Mattes & Luescher-Mamashela 2012; Mattes & Mozaffar 2011; Mattes & Mughogho 2010). This earlier work has been incorporated into the SERU survey tool produced by the University of California, Berkeley, to include a wider range of engagement indicators in the present project. HERANA studies on higher education's contribution to democracy have sought to identify aspects of student engagement that contribute to the development of citizenship competences as among the outcomes of higher education.

About the study

Purpose and research questions

The purpose of this chapter is to explore which aspects of student engagement effectively develop high-level citizenship competences among undergraduate students in African universities. It therefore aims to identify specific ways that effectively make the African

university a *training ground for democracy*; that is, to investigate how the student experience and student engagement in academic, social and political activities on campus (taking into account the reality that many African universities are hothouses of student activism) can be harnessed for citizenship education and the education of democratic leaders, in a way that will effectively contribute to the development of their societies. In particular, the chapter investigates the following questions:

- Do students who report higher levels of student engagement (in terms of academic, social and political engagement as well as engagement with diversity on campus) show higher levels of citizenship competences (defined in terms of support for democracy and good citizenship, critical thinking, leadership and presentation skills, and diversity and social skills)?
- What is the role of institutional culture? Are students who perceive a more open and engaged institutional culture more socially and politically engaged, and do they report higher levels of citizenship and diversity competences?

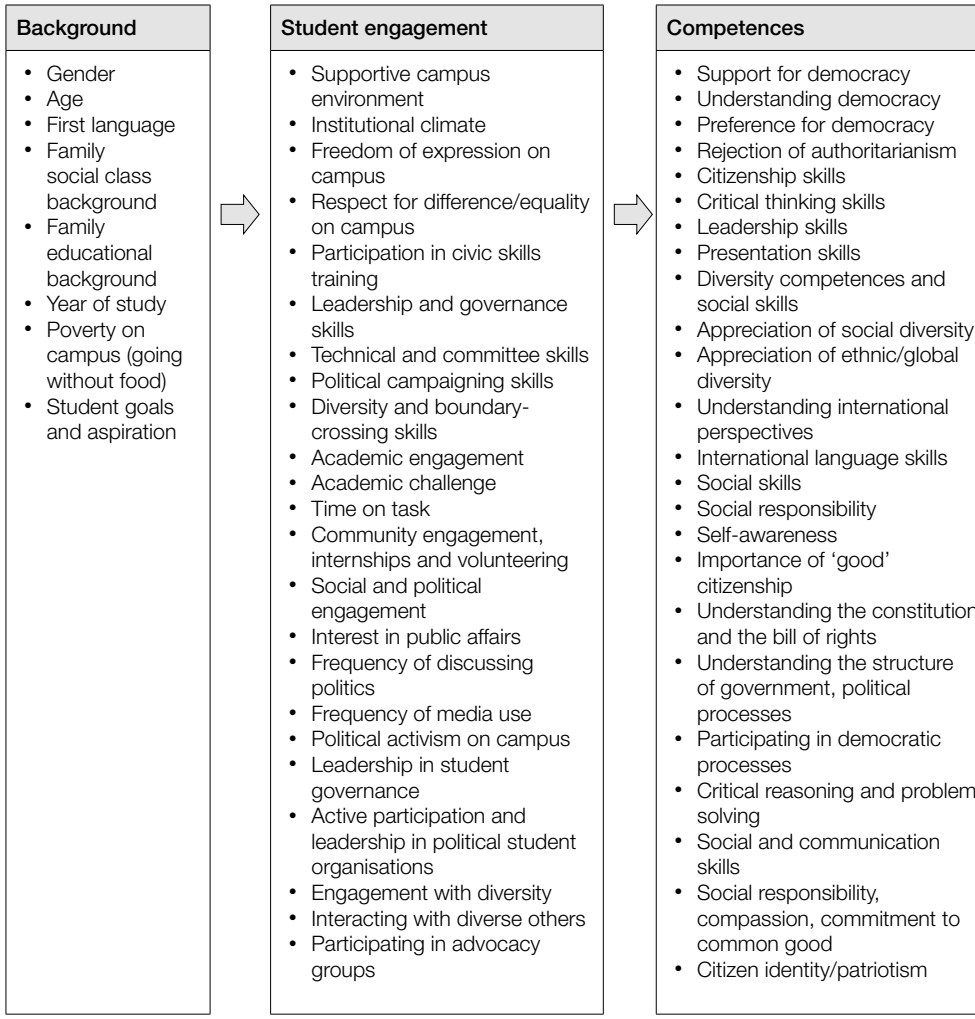
Conceptual framework

The HERANA Citizenship Module provides a framework for investigating the relationship between student engagement and citizenship competences in the form of a conceptual map based on an input–environment–output model of the student experience impact on graduate outcomes (compare Figure 11.1).

In keeping with the definition of student engagement, the point of departure for the development of the model is the proposition that aspects of academic, social and political engagement on campus, including the campus environment, affect the development of citizenship competences. The model hypothesises that apart from student demographic, family and academic background variables, various components of student engagement serve as predictors of students' attitudes towards democracy and good citizenship, and enhanced levels of civic skills, diversity and social skills. Related survey questions measuring student engagement and citizenship competences can be plugged into an existing student engagement survey or be used as a stand-alone mini-survey. The questionnaire draws on the SERU survey developed at the University of California, Berkeley, and incorporates additional indicators on students' political attitudes and behaviours initially developed for the HERANA Phase 1 student surveys as well as a few new questions.

The basic purpose of the HERANA Citizenship Module's conceptual map is to invite questions and hypotheses as to the relationship between its various components.

Figure 11.1 Schematic concept map of the HERANA Citizenship Module



Survey methodology and sample

Insofar as the HERANA Phase 2 student surveys were considered pilot surveys for the development and refinement of the Citizenship Module, the selection of case institutions was pragmatic. All the HERANA partner institutions[4] were invited to participate in the surveys; however, in the final round of selection, only the two institutions that were most committed were included in the surveys. The University of Cape Town (UCT) in South Africa

4 The universities of Botswana, Cape Town, Dar es Salaam, Eduardo Mondlane, Ghana, Mauritius, Makerere and Nairobi.

was selected because a SERU-Africa pilot survey had been conducted there in 2013, and the University had been part of the HERANA Phase 1 student surveys into higher education and democracy. Makerere University in Kampala (MAK) in Uganda was included following presentations at the HERANA workshop of November 2012, where HERANA members of the University expressed great interest in participating in the project. During May and June 2012, the SERU questionnaire, including the HERANA Citizenship Module, was developed jointly between the UCT's Department of Student Development, the CSHE at the University of California, Berkeley, and the Centre for Higher Education Transformation (CHET). The draft questionnaire was presented to, and discussed and tested, in a series of meetings with student groups and data users.

In South Africa, the survey was piloted and the questionnaire, information sheet and consent form were assessed and approved by the UCT Centre for Higher Education Development Research Ethics Committee. During the periods October–November 2012 and February–April 2013, the survey was opened to all UCT undergraduate students, who were asked via email and in a sustained campaign to complete the SERU online survey to provide feedback on their experiences at the institution. In a series of meetings between CHET and the Director of Quality Assurance, the UCT questionnaire, which was in the process of being administered at UCT, was adapted, shortened and indigenised to suit the Ugandan and MAK context. This process was concluded with meetings at MAK in November 2013 during which the draft MAK questionnaire was piloted with student groups, including representatives of the Student Guild. In addition, the Dean of Students at MAK was consulted and eventually the questionnaire was revised, finalised and ready for implementation. As was the case at UCT, the survey was designed as an online survey and thus transferred to the Survey Monkey platform. Data collection started at MAK in November 2013 and concluded in January 2014. It was accompanied by a highly visible campaign similar to that at UCT.

In keeping with the SERU design, the surveys took a census approach by inviting all undergraduate students on campus to participate. The aim of a census approach is to gain a very large sample that will allow for analyses into various subgroups of students and subunits of the student experience. It can also be argued, however, that it is a somewhat convenient approach to sampling because the resultant sample might not be representative of the overall student population. Hence, the emerging sample was closely monitored during the data collection process, and the ongoing campaign for student participation was directed in such a way as to ensure that not only a large but also a representative sample would ultimately emerge. As such, the UCT survey was extended into 2013 to allow for a greater response rate, and at MAK a drive involving the college student representatives was instituted in January 2013 so as to encourage the participation of students from all colleges. Nonetheless, the online surveying methodology of the study yielded very different samples at the two pilot universities.

In the case of UCT, of the total of 16 168 enrolled undergraduate students (2012 data), 2 502 respondents completed the survey in full, or almost in full, representing a response rate of over 15%. The realised sample of UCT respondents turned out to be largely representative in terms

of gender, citizenship, race, field of study and year of study, with some overrepresentation of about six percentage points of African students; science, engineering and technology students; and first-year students. About 98% of the respondents were bachelor and bachelor-honours students, with the remainder enrolled in certificate and diploma programmes.

In the case of MAK, a sample of 941 was obtained from the total undergraduate population of 34 635 students (2013/2014 numbers), which represents a response rate of just under 3%. When considering the relatively small size of the sample it must be kept in mind that just over half of the undergraduate students at MAK are regular daytime students, 35% are late afternoon/evening students and 9% external students, who were seemingly more difficult to reach. Despite all efforts, the MAK sample turned out rather skewed in terms of broad field of study with an overrepresentation of science, engineering and technology students (and particularly students in the computer sciences), and in terms of gender. The former is undoubtedly an artefact of MAK students' access to computing facilities and internet bandwidth on and off campus. Moreover, this was only the second online survey ever conducted with MAK students, and the first such survey was confined to a very small and targeted sample and administered in computing facilities to sampled students. Given the different sample sizes and representativeness of samples of the two pilot cases, the data for each pilot case has been analysed separately. Table 11.1 presents selected demographic profile indicators of the respective student bodies and survey respondents.

In addition to the demographic data presented in Table 11.1, the survey also includes background indicators for economic and educational disadvantage. Looking at the data from UCT, it shows that a number of the students come from economically and/or educationally disadvantaged backgrounds. Just over two in five students (42%) are second-language speakers of English whilst three in ten (30%) are first-generation higher education students. Just over one in five students (22%) indicated that they grew up in a poor/low-income working class family, while only 4% said that they had gone often or very often without food for longer than a day during the current academic semester. In terms of university goals, an overwhelming majority of students in the UCT sample – just over nine in ten (92%) – said that their most important university goal was obtaining the skills they needed for their future career. A majority of just over three in five (62%) UCT undergraduate students aspired to obtain a masters or a doctoral degree qualification.

At MAK, 76% of the sample (just over three in four students) were second-language speakers of English and 24% (almost one in four students) were first-generation higher education students. Almost half (46%) indicated that they grew up in a poor/low-income working class family, and the shocking figure of just over one in five (22%) said that they had gone often or very often without food for longer than a day during the current academic semester. Thus, not only was there a notable proportion of students who came from academically and economically disadvantaged backgrounds, but a significant proportion of students at MAK continued to experience economic deprivation while studying. In terms of university goals, just like at UCT, an overwhelming majority of MAK students – just over nine in ten (93%)

– said that their most important university goal was obtaining the skills they needed for their future career. Moreover, close to nine in ten (87%) of the sample of students at MAK aspired to obtain a masters or a doctoral qualification. Conversely, only just over one in ten (12%) aspired to leave university with an undergraduate diploma or degree alone.

Table 11.1 Demographic background of students

Demographic profile indicators	University of Cape Town		Makerere University	
	Total undergraduate (2012)	*Sample (2012/2013)*	*Total undergraduate (2013/2014)*	*Sample (2013/2014)*
Gender Valid N	16 168	2 139	33 782	847
Male	47%	45%	56%	78%
Female	53%	55%	44%	22%
Age Valid N	n/a	2 502	n/a	820
Average Age	n/a	21.1 years	n/a	22.1 years
Nationality Valid N	16 168	2 502	n/a	n/a
Citizen/Permanent Resident	89%	85%	n/a	n/a
International	11%	15%	n/a	n/a
Population Group Valid N	16 168	2 500	n/a	n/a
African	32%	38%	n/a	n/a
Coloured	15%	11%	n/a	n/a
Chinese	1%	1%	n/a	n/a
Indian	8%	6%	n/a	n/a
White	33%	31%	n/a	n/a
No answer/Don't know	11%	13%	n/a	n/a
Broad Field of Study Valid N	16 168	2 502	33 769	936
Social sciences & humanities	32%	30%	48%	15%
Science, engineering & technology	40%	46%	36%	81%
Commerce	28%	24%	16%	4%
Year of Study Valid N	16 168	2 500	34 635	941
1st Year	34%	40%	32%	24%
2nd Year	30%	29%	31%	43%
3rd Year	25%	24%	31%	26%
4th Year	9%	6%	6%	6%
5th Year +	2%	1%	1%	1%

Insofar as the HERANA Phase 2 student surveys were conceived as pilot studies, there are a number of limitations. Firstly, all the survey data is based on students' self-reports. There are various differences in the way students self-assess their proficiencies and report levels of

engagement. On the one hand, generating data based on self-reports is a widely used practice and generally considered to be valid. In the specific case of SERU data, Douglass et al. (2012), in a study using the University of California's SERU and Grade Point Average data, showed that there is a strong face validity of self-reported proficiencies in the SERU survey. However, as will be shown below, students from MAK and UCT use different baselines in their self-assessment. Secondly, the online survey methodology yielded quite different samples for UCT and MAK, whereby the former was more representative of the undergraduate student body than the latter on key criteria and, therefore, captures a more accurate picture of the student population average. Despite bias in the realised samples, no statistical weights were applied to either dataset to 'correct' the samples statistically. Hence, for all these reasons, the analysis of the two datasets proceeds separately and in parallel, and comparisons between the two datasets, as well as the generalisability of inferences suggested in this study, must be treated with caution.

Analytic approach, variables and descriptive analysis

The main purpose of the analysis of the pilot surveys is to identify reliable indicators of the impact of student engagement on students' citizenship competences. Such indicators can be used to generate relevant institutional data in order to change institutional policy and practices, and thereby enhance graduate citizenship competences as a key social outcome of higher education in Africa. An in-depth analysis of the two sets of survey data using descriptive, factor and reliability analyses has highlighted ways in which independent and dependent variables can be indexed and clustered respectively, for the purpose of multivariate analysis.[5]

The descriptive analysis of most student engagement items in the questionnaire shows that the *independent variables* of interest can be clustered under the following rubrics:[6]

1. *Supportive campus environment,* in particular, variables measuring perceptions of a friendly, caring, tolerant and intellectual campus climate; freedom of expression on campus in terms of political opinions and religious beliefs; and respect for difference.
2. *Academic engagement*, which comprises variables measuring active learning, collaborative learning and staff-student interaction.
3. *Co-curricular engagement*, which measures the extent of student participation in civic, leadership and diversity skills training; political activism on campus; leadership in student governance; active participation and leadership in political student organisations; and active participation and leadership in advocacy and developmentally orientated student societies.
4. *Discursive engagement*, which measures the frequency of students having meaningful

5 Details of the factor and reliability analyses are reported in the HERANA research report (Luescher-Mamashela forthcoming), including the exact eigenvalues, factor loadings and Cronbach alpha estimates of all composites.

6 Note that these do not correspond entirely to the clustering proposed at the outset in the HERANA Citizenship Module (compare Figure 10.1).

conversations with diverse others; their use of a diversity of news media; and interest in and discussion of public affairs.

The descriptive analysis of the UCT data shows that the campus climate was assessed by students as tolerant of diversity; somewhat friendly but also somewhat impersonal; and only somewhat safe. Diversity and intellectualism rated high on the positive side of students' assessment, while elitism and lack of affordability were prominent on the negative side. The main variation in the MAK dataset was that the Ugandan students considered the MAK climate somewhat less intellectual and academically easier, and only somewhat tolerant of diversity. The specific indicators for respect for diversity on campus and freedom of expression show that a sizeable majority of MAK students perceived the institutional climate as respecting of diversity on various measures.[7] Like at MAK, it is concerning that only about half of the UCT students felt that they could express their political beliefs freely on campus, while more than half felt that there was generally respect for diversity on campus.

Typically, the core focus of student engagement surveys is academic engagement. It is also well-established in scholarly literature that certain types of in-class and out-of-class academic engagement activities may contribute positively to citizenship competences (Winchester-Seeto et al. 2012). The analysis in this study shows significant variance in the levels of academic engagement on various indicators. Students at MAK, in particular, reported very high levels of active and collaborative learning and of applying new knowledge in their everyday lives, and of frequently helping fellow students with their academic work. At UCT, the practice of active and collaborative learning was generally lower.

Turning to co-curricular engagement, Mandew (2003: 69–70) argues that student affairs and services can contribute directly to making the African university a training ground for citizenship by offering training programmes for the development of specific competences. The surveys show a rather low uptake of such training programmes in general: only one in six students or fewer at UCT, and only between one and two in five MAK students, participated often or very often in such activities. The surveys also show that participation of student leaders in such training opportunities was much more frequent than among students in general.

Co-curricular, political and social engagement on campus also includes activist-type political participation, especially attending political meetings and protesting on campus, as well as active student participation and leadership in key organisational structures on campus, including students taking on official student representative roles. The HERANA Phase 1 surveys indicated very high levels of political participation and leadership among students, so much so that it was argued that 'university and student life present unmatched opportunities for exercising political activity and organisational leadership at a young age' (Luescher-Mamashela et al.

7 This excludes questions that deal with sexual orientation. All questions related to sexual orientation had to be excised from the MAK questionnaire given the legally sanctioned homophobia and criminalisation of lesbian, gay, bisexual, transgender and intersex (LGBTI) persons in that country. MAK project members were concerned about data security and felt that collecting data on sexual orientation could lead to an exposure of LGBTI persons, with potentially dire legal consequences for them.

2011: 111). In the current survey, a quarter or more of UCT students reported participation in some form of student activism; a sizeable number participated in a diversity of organisational structures. Specifically, about two in five students participated actively in politically orientated organisations on campus, and about one in ten had performed formal student representative roles (e.g. as members of the Students' Representative Council). At MAK, the level of informal political participation was even higher than at UCT. In addition, leadership of MAK students in formal organisational contexts was also high: over three in five students reported active membership or leadership in a politically orientated student organisation and/or holding a formal position in student governance.

Finally, the indicators for discursive engagement with politics, public affairs and diversity show that there was considerable interest in this regard among students. At both UCT and MAK, about two in three students said that they were somewhat or very interested in public affairs and politics, and almost a third reported that they discussed politics frequently (although more so off than on campus). The internet and social media were the most frequently used news media among UCT students, followed by radio and television. In addition, about two in five UCT students read newspapers daily or almost daily. MAK students reported much more frequent use of all news media: between eight and nine in ten students used a diversity of news media daily or almost daily.

Moreover, close to half of the UCT students (48%) had had meaningful conversations often or very often in the last year with fellow students who differed from them in terms of nationality and race/ethnicity, to the extent that they had gained a deeper understanding of other perspectives. In addition, two out of five students (40%) had had such interactions with students of a different class and, less frequently, a different religion (35%) and political opinion (30%). Conversely, there were sizeable proportions of students who said that they had never or rarely had such conversations with students of a different sexual orientation (33%), disability status (60%) or health/HIV-status (72%). At MAK, a sizeable proportion of students – between over a quarter (26%) and close to a half (47%) – reported having had meaningful conversations often or very often from which they gained new perspectives. In particular, more students gained from conversations with students who differed from them in terms of class, religion, political opinion and nationality; conversely, like at UCT, matters of health ranked lowest.

The analysis of *dependent variables* produces the following four sets of citizenship competences:

1. *Civic skills*, which measures levels of critical thinking skills; argumentation and presentation skills; and leadership skills (measured individually as well as in combination with diversity and social skills).
2. *Diversity and social skills* as a latent variable made up of variables measuring appreciation of social, ethnic/racial and global diversity; level of understanding of international perspectives; social skills; sense of social responsibility; and self-awareness.

3. *Attitudes towards democracy*, which measures students' understanding of democracy, support for democracy and the rejection of non-democratic alternatives.
4. *Attitudes towards good citizenship*, which is a latent variable combining variables regarding attitudes towards critical reasoning and problem-solving skills; social responsibility; compassion; commitment to the common good; social skills and communication skills; understanding the constitution, bill of rights etc.; understanding government, political processes etc.; participating in democratic processes; and patriotism.

The descriptive analysis of civic, diversity and social skills shows that all student groups at UCT and MAK rated themselves more proficient in those skills after having spent some time at university, than when they had started at university. It also shows that MAK students generally considered themselves more proficient at the beginning of their studies than the UCT students did, while UCT students reported higher learning gains as they advanced in years of study. Conversely, there was no positive in-college-effect with respect to attitudes in support of democracy; indeed, more senior students tended to be marginally *less* supportive of democracy than first-year students (although this was not statistically significant). Finally, with respect to students' attitudes towards various attributes of good citizenship, MAK students generally rated the importance of all attributes higher than the UCT students did. But, in both cases, about eight in ten students considered critical reasoning and problem-solving skills, as well as social skills and communication skills, to be important or very important, while considerably fewer did so for understanding government and political processes.

Results

By using regression analyses and partial correlation matrices, this section directly addresses the core research question of the project: namely, whether students who report higher levels of engagement also report higher levels of citizenship and diversity competences. The results of the analyses yield important insights into the relationship between student engagement and citizenship competences, thus providing leads towards further study and suggesting institutional policy implications relevant for the two case institutions. However, the main purpose of the pilot was to test the HERANA Citizenship Module's usefulness as a concise, valid and reliable tool for studying student engagement's impact on citizenship competences.

In order to predict empirically the extent to which student engagement influences the development of citizenship competences, two types of analyses were performed: multiple stepwise regressions and partial correlation coefficients. The latter correlates *every* aspect of student engagement with *all* the competences using partial correlation coefficients (controlling for social and educational backgrounds of students).

Partial correlations[8]

For the UCT data, the matrices indicate that combined civic, diversity and social skills most strongly correlate with civic skills training activities (.424, p<0.001), as well as active learning (.317, p<0.001) and collaborative learning (.229, p<0.01). Students with higher levels of skills are also likely to seek staff-student interaction (.360, p<0.001). In addition, they are more likely to be interested in and discuss politics regularly on campus (.261, p<0.01), and to be actively engaged in membership or leadership of student societies, especially in advocacy groups or student-run development agencies (.236, p<0.001). Weaker partial correlations can also be observed with other political and social engagement variables and with respect to diversity engagement. Furthermore, the analysis shows that diversity competences and social skills (on their own and in combination with citizenship skills) correlate well with positive evaluations of the institutional climate. Evaluating the institutional climate as friendly, caring, tolerant and intellectual correlates well with citizenship and diversity skills combined (.270, p<0.01) and also with diversity competences on their own (.251, p<0.01). In addition, the perceptions of the respect for diversity on campus co-varies positively with diversity and social skills (.214, p<0.05) as well as with civic, diversity and social skills combined (.205, p<0.05).

The analysis of the UCT data therefore shows that student engagement positively co-varies with civic, diversity and social skills in the following ways:

- Participation in civic skills training activities co-varies moderately strongly-to-strongly with civic, diversity and social skills in combination, as well as with diversity and social skills and with leadership skills on their own.
- Active learning, collaborative learning and staff-student interactions co-vary modestly-to-moderately with levels of citizenship and diversity competences in combination and, except for leadership skills, consistently on their own.
- The combination of civic, diversity and social skills, and diversity and social skills on their own, correlate modestly-to-moderately with interest in and discussion of politics and with being active in student advocacy societies, student political organisations and student governance. The combined variable also co-varies with student activism.
- A positive evaluation of the campus climate and respect for diversity on campus modestly co-varies with citizenship and diversity competences (but not with the individual civic skills measures).

The analysis of correlations between student engagement variables and attitudes towards democracy and good citizenship in the UCT dataset tends to be less significant and weaker than those observed with respect to civic, diversity and social skills. The analysis also shows that several

8 Table 11.3 in the Discussion section of this chapter, summarises the findings from the partial correlation matrices in terms of the observed probabilities. For the complete matrices, see Luescher-Mamashela (forthcoming, Appendix 2).

student engagement measures modestly-to-strongly correlate. In particular, the correlation matrices show that it is far more likely that students will have a positive attitude towards various attributes of good citizenship if they frequently have meaningful conversations with students that are different from them (.489, $p<0.001$) and show an interest in and frequently discuss politics on campus (.440, $p<0.001$). In addition, moderate-to-modest correlations can be observed with variables in the co-curricular engagement cluster: participation in student activism (.233, $p<0.01$); active membership or leadership in student advocacy groups (.207, $p<0.05$) and any other form of student leadership (.182, $p<0.05$); and participation in specific civic skills training (.186, $p<0.05$). Lastly, a positive attitude to good citizenship modestly co-varies with academic engagement; in particular, with active learning (.208, $p<0.05$) and staff-student interaction (.186, $p<0.05$). Only one aspect of the institutional culture – that is, students' perception of freedom of expression on campus – is significantly, albeit only modestly, correlated with good citizenship (.186, $p<0.05$). Thus, while there are significant correlations of student engagement with attitudes towards good citizenship, it is quite disappointing to find that support for democracy does not correlate positively with most measures of student engagement that one would expect. Indeed, the analysis shows that only one academic engagement variable – preparing for and attending scheduled academic activities – is modestly correlated with the rejection of authoritarianism (.219, $p<0.05$), and that doing fieldwork is negatively and moderately correlated with positive understandings of democracy (-.242, $p<0.01$).

In summary, the correlation analysis of the UCT dataset shows that student engagement co-varies with support for democracy and attitudes of good citizenship in the following ways:

- Higher levels of interest in and discussion of politics and public affairs, as well as conversations with diverse others, show the strongest co-variance with positive attitudes towards good citizenship;
- Participation in various student societies moderately co-varies with positive attitudes towards good citizenship;
- Active learning and participation in skills training co-varies modestly with positive attitudes towards various attributes of good citizenship;
- A positive evaluation of the institutional climate in terms of freedom of expression modestly and positively co-varies with attitudes towards good citizenship; and
- Conversely, the more direct measures for support for democracy (such as indicators for understanding what democracy is, preference for democracy and rejection of authoritarianism) do not have widespread or strong relationships with any measure of student engagement.

Turning our attention to the MAK data, many similar findings can be observed, even if the variables are not entirely the same. Students with higher levels of key civic, diversity and social skills have again been more likely to be involved in civic skills training (.344, $p<0.001$), and they are more likely to be active learners (.226, $p<0.001$) and collaborative learners (.318,

p<0.001) who also participate in enriching learning activities such as fieldwork, tutoring or community engagement (.208, p<0.01). In addition, a friendly, caring, tolerant and intellectual institutional culture (.155, p<0.05) that is also perceived as respecting of otherness (.245, p<0.001), and thus enabling of meaningful conversation with diverse others (.166, p<0.05), all correlates modestly with combined civic, diversity and social skills.

When looking at critical thinking skills and leadership skills in the MAK data, the most important new finding is that very high levels of current leadership skills are strongly positively correlated with civic skills training (.494, p<0.001). In addition, participation in student leadership – as a student representative with an institution-wide mandate (.216, p<0.01), a student leader in a student society (.285, p<0.001), a student representative in a university governing body (.171, p<0.05), or a student activist (.166; p<0.05) – all emerge with modest strength as a co-variant of very high leadership skills. Very high proficiency in critical thinking skills also correlates moderately with civic skills training (.265, p<0.001), collaborative learning (.256, p<0.001), and an institutional culture that respects diversity (.214, p<0.01). Few other variables co-vary with very high proficiencies in critical thinking and only very modestly. Finally, a closer look at diversity competences and social skills brings no new statistically significant variables to the fore; all variables correlating with the combined skills set also correlate with diversity and social skills, albeit in the latter case at a weaker strength (compared to the UCT data).

The analysis of the MAK data therefore shows that student engagement positively co-varies with citizenship and diversity competences in the following ways:

- Participation in civic skills training activities co-varies moderately-to-strongly with higher levels of competences, most strongly with leadership skills, but also with all other variables as well as the combined skills set of civic, diversity and social skills.
- Active learning, collaborative learning and participation in enriching learning experiences modestly-to-moderately co-vary with levels of civic, diversity and social skills (but not with all individual skills items).
- Citizenship and diversity competences also co-vary modestly-to-moderately with interest in and discussion of politics and with being active in student advocacy societies, student political organisations, student governance and student activism.
- Participation in student leadership correlates at a modest-to-moderate level with very high self-reported leadership skills.
- A positive evaluation of the institutional culture, and especially respect for diversity on campus and a more positive campus climate, co-vary modestly with citizenship and diversity competences.

Moreover, in the MAK dataset, involvement in civic skills training again emerges as a significant correlate of attitudes towards good citizenship, as indicated by a moderately strong and positive correlation coefficient of .328 (p<0.001). Students who appreciate the importance

of the attributes of good citizenship also tend to be active learners (.300, p<0.001) who are interested in and frequently discuss politics and public affairs on campus (.323, p<0.01). More modest correlations can be observed with collaborative learning (.119, p<0.05), involvement in student leadership (.172, p<0.05), participation in student activism (.189, p<0.01), as well as with all the indicators of a supportive institutional culture (.170, p<0.05 for a friendly, caring, tolerant and intellectual campus climate; .161, p<0.05 for freedom of expression; and .150, p<0.05 for respect for diversity on campus).

Compared to the UCT data, support for democracy correlates with some more measures of student engagement in the MAK data, albeit still only at modest-to-moderate strength. Preference for democracy correlates with positive evaluations of institutional culture, especially respect for diversity on campus (.282, p<0.001), with freedom of expression on campus (.214, p<0.01) and with a friendly, caring, tolerant and intellectual climate (.166, p<0.05). The rejection of authoritarianism also correlates with certain aspects of student engagement. In summary, the analysis of the MAK data therefore shows that student engagement co-varies with attitudes towards democracy and good citizenship in the following ways:

- Participation in civic skills training activities moderately and positively co-varies with support for the attributes of good citizenship, but not with the other attitudinal variables in this set of competences. Only two other variables in the co-curricular engagement cluster modestly correlate with good citizenship (i.e. participation in student leadership and student activism).
- Active learning moderately co-varies with attitudes towards good citizenship and modestly with the rejection of authoritarianism (especially one-party rule and presidential one-man rule). A modest correlation can also be observed with collaborative learning.
- Discursive engagement (with respect to interest in and discussion of politics and public affairs) modestly and positively co-varies with attitudes towards good citizenship, while media use and meaningful conversation with others positively co-vary with the rejection of military rule and one-party rule respectively.
- The covariance of most variables within the attitudes to democracy and good citizenship set of citizenship competences, including preference for democracy, rejection of authoritarianism and positive attitudes towards good citizenship, must be seen in the context of students' evaluation of the institutional culture, especially freedom of expression and respect for diversity on campus, and to a lesser extent the general campus culture (with a modest and positive correlation).

For the purpose of this chapter, the inter-correlation between various student engagement measures is important to keep in mind when considering the results of the regression analysis conducted below. Insofar as a regression analysis indicates the *best* predictors of variation in a dependent variable, an independent variable that is well correlated with other independent

variables can 'mask' the effects of other independent variables on the dependent variable, thus rendering their effect statistically insignificant. In a stepwise regression, the results of well-correlated individual blocks of variables thus typically only produce one – the best – variable per block as significant. This is particularly important for the purpose of inferring policy implications: in the design of an institutional intervention (e.g. a new civic skills training activity in student affairs), one might want to incorporate various engagement aspects that are well correlated as they might have mutually reinforcing effects. Secondly, it is also important when considering what (and what not) to measure in future surveys. The fact that a particular variable is not statistically significant in a regression does not mean that it has no effect on enhancing citizenship competences and can therefore be discarded; rather, its effect may be encompassed (and indicated) by a well co-related variable.

Regression analysis

The results of multiple stepwise regressions performed for the purpose of this study indicate that student engagement variables indeed act as reliable predictors that provide a solid explanation of citizenship competences. In the best and most complete statistically-significant regression model (as summarised in Table 11.2), the various indicators of the student experience explain up to a third of the variation in levels of combined civic, diversity and social skills (UCT Adjusted R^2 = .310; MAK Adjusted R^2 = .307). They also explain, separately, diversity and social skills (UCT Adjusted R^2 = .259; MAK Adjusted R^2 = .249), current critical thinking skills (UCT Adjusted R^2 = .116; MAK Adjusted R^2 = .215) and current leadership skills (UCT Adjusted R^2 = .228; MAK Adjusted R^2 = .372), as well as students' attitudes towards good citizenship (UCT Adjusted R^2 = .227; MAK Adjusted R^2 = .219).

With regard to the UCT data, Table 11.2 shows that the best model predicts up to 31% of variance in the civic, diversity and social skills set and 23% of the variance for attitudes towards good citizenship. For the former, the significant predictors are:

- The number of years a student has spent at university (academic year) as the only significant background variable;
- A supportive institutional culture in terms of students' perception of respect for diversity;
- Staff-student interaction from the cluster of academic engagement variables;[9]
- Participation in civic skills training from the co-curricular engagement cluster; and
- Interest in and discussion of politics from among the discursive engagement variables.

There is additional variation in the set of predictors for the diversity and social skills set, and current levels of analytical and critical thinking skills and leadership skills (when measured

9 Active and collaborative learning appear as not statistically significant in the regression. However, as noted above, the partial correlation matrices show that both variables are positively correlated with staff-student interaction: strongly in the case of active learning (.576, $p<0.001$) and moderately in the case of collaborative learning (.318, $p<0.001$).

Table 11.2 Predictors of citizenship competences

Demographic profile indicators	University of Cape Town					Makerere University				
	Combined civic, diversity and social skills	Diversity and social skills	Critical thinking skills	Leadership skills	Good citizenship	Combined civic, diversity and social skills	Diversity and social skills	Critical thinking skills	Leadership skills	Good citizenship
Demographics										
Disadvantaged student	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Population group (black) (UCT)	NS	NS	NS	NS	.069**	N/A	N/A	N/A	N/A	N/A
Academic year	.212**	.190**	NS	.145*	NS	.191**	.161**	NS	.191***	NS
Institutional culture										
Friendly, caring, tolerant, intellectual	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Freedom of expression on campus	NS	NS	NS	NS	.136***	NS	NS	NS	NS	NS
Respect for diversity on campus	.252**	.214*	.221*	.188*	NS	.253***	.267***	.185**	.136*	.136*
Academic engagement										
Active learning	NS	NS	NS	NS	NS	NS	NS	NS	NS	.200**
Collaborative learning	NS	NS	NS	NS	NS	.178**	.170**	.257***	NS	NS
Staff-student interactions (UCT) Scheduled academic activity (MAK)	.236**	.233**	.219*	NS	NS	NS	NS	.151*	NS	NS
Co-curricular engagement										
Civic skills training	.215**	.178*	NS	.318***	NS	.287***	.243***	.245***	.362***	.263***
Student activism	NS	NS	NS	NS	.065*	NS	NS	NS	NS	NS
Student leader[1]	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Member/leader: advocacy societies	NS	.194*	NS	NS	NS	NS	NS	NS	NS	NS
Discursive engagement										
Meaningful conversations with others	NS	NS	NS	NS	.131***	NS	NS	NS	NS	NS
Media use	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Interest in, and discussion of politics	.280**	.281**	.227*	NS	.284***	NS	NS	NS	NS	.176*
Multiple r	*.631*	*.594*	*.473*	*.569*	*.484*	*.599*	*.553*	*.523*	*.647*	*.530*
Adjusted R^2	*.310*	*.259*	*.116*	*.228*	*.227*	*.307*	*.249*	*.215*	*.372*	*.219*

Note: Cells display standardised (Beta) regression coefficients. NS p = >0.05, * p = <0.05, ** p = <0.01, *** p = <0.001

[1] Summarised display: NS in all regressions for the variables: student leader at institutional level; student member/leader in various relevant societies; student representative in governing bodies; student member/leader of student political organisations

separately from the combined skills set variable). In this regard, it is noteworthy that active membership or leadership in a student advocacy group serves as a significant predictor for levels of diversity and social skills, while neither the academic year nor civic skills training are significant predictors for proficiency levels of critical thinking skills. However, civic skills training emerges as a good predictor for levels of leadership skills.

Furthermore, Table 11.2 shows that in the case of UCT the best predictors for attitudes towards good citizenship are:

- Population group (race) as the only statistically significant background variable, but with a very marginal effect;
- Students' perception of the extent of freedom of expression on campus as an institutional culture variable;
- Student involvement in student activism (but again, with a very weak effect); and
- Of the discursive engagement variables, having meaningful conversations with diverse others frequently and high levels of interest in discussion of politics and public affairs on campus.

Given the non-significant partial correlations, no regressions were run for the other variables related to attitudes towards democracy.

With regard to the MAK data, Table 11.2 shows that the best model predicts up to 31% of the variance in the combined civic, diversity and social skills set and up to 37% of the variance in leadership skills. For the former, the significant predictors are:

- The number of years a student has spent at university (academic year);
- A supportive institutional culture in terms of students' perception of respect for diversity;
- Collaborative learning from among the cluster of academic engagement variables; and
- Frequent participation in civic skills training from the co-curricular engagement cluster.

While there are differences in the extent to which each of these variables are able to predict the individual citizenship skills sets tested for, it is worthy to note that levels of critical thinking skills are best predicted by academic engagement than any other competences and that, conversely, leadership skills cannot be predicted by any of the academic engagement variables, but rather by participation in civic skills training.

Finally, Table 11.2 also shows that among MAK students, the best predictors for attitudes towards good citizenship are involvement in civic skills training; active learning; and discursive engagement in the context of a supportive institutional culture, especially with regard to students' perceptions of the level of respect for diversity on campus.

Discussion

Three years ago, the HERANA Phase 1 studies showed that highly educated citizens in Africa play a key role as 'institutionalisers' in the complex institutions of state and civil society that characterise modern democracy (Mattes & Mozaffar 2011). However, these studies could not account for specific ways in which this unique contribution of higher education to political development might be enhanced to ensure high levels of citizenship competences among graduates. The same can be said for other findings of HERANA 1 studies: namely, the high levels of criticalness among students, and the limited contribution that higher education made to support for democracy among graduates (Luescher-Mamashela et al 2011; Mattes & Luescher-Mamashela 2012). The aim of the HERANA Phase 2 student surveys was therefore to identify specific ways that make the African university an effective training ground for democracy – in other words, to investigate how student engagement in academic, social and political activity can be harnessed for citizenship education and the education of the next generation of democratic leaders in Africa. The guiding research question for the surveys conducted between 2012 and 2014 at MAK and UCT was therefore: Which aspects of the student experience are responsible for the development of positive attitudes towards democracy and good citizenship, high levels of critical thinking and leadership skills, and a deep appreciation and respect for diversity?

By investigating this question, the study ventured into unchartered territory – not only in the African context, but well beyond – as work on student engagement and the social outcomes of higher education is still scarce. This study has shown that certain aspects of student engagement (which can be clustered under the four rubrics of institutional culture, academic engagement, co-curricular engagement and discursive engagement) effectively develop high-level citizenship competences among undergraduate students in the two African universities of the pilot study.

The study has found that by using the set of questions referred to collectively as the HERANA Citizenship Module, universities can measure the student experience of higher education with respect to its contribution to the development of relevant citizenship competences. The findings of the analysis illustrate how processes of student engagement relate to and enhance citizenship competences and, by extension, provide evidence of a university's contribution to democracy as a key social outcome of higher education. Moreover, they suggest aspects of student engagement for the attention of institutional policies and practices by providing high-quality, actionable data for institutional planning, policy and practical intervention.

Student engagement and citizenship competences

This study's venture into rather unchartered territory has been path-breaking and yet the findings presented in this chapter are not altogether surprising. It is well established that active learning, collaborative learning, and frequent staff-student interaction are beneficial to student

retention and success (Tinto 2014) and to critical and creative thinking (Winchester-Seeto et al. 2012); that student experiences with diversity and a diversity-respecting institutional culture have a positive effect on diversity skills and other graduate attributes (Denson & Zhang 2010); and that social skills, an appreciation of social justice and good citizenship are enhanced through engagement with public affairs, global perspectives and diverse others (Schoeman 2006; Winchester-Seeto et al. 2012). Overall, it is largely accepted that university policies and practices make a difference in civic education and that characteristics of the student experience (such as a campus culture where public debate is encouraged; pedagogies of active and collaborative learning; and students' social and political engagement on campus) are beneficial to civic education (Plantan 2004).

What is new and striking about the HERANA 2 survey findings is to see *exactly how* these characteristics of the student experience uniquely and in conjunction contribute to distinct sets of citizenship competences. It is no less remarkable to be able to demonstrate this in the cases of two African flagship universities and, therefore, to have findings and conclusions that are immediately relevant and more likely transferable to other universities in the African context and to higher education in the developing world.

In terms of specific policy implications, the pilot studies thus suggest that the level of citizenship competences measured by the HERANA Citizenship Module can be increased by:

- Creating an institutional culture that students perceive to be friendly, caring, tolerant, intellectual and respectful of diversity, and where religious and political opinions can be expressed freely;
- Creating a culture of teaching and learning where students become active and collaborative learners along with an academic 'open-door' policy that enables staff-student interaction;
- Offering training opportunities in a wide range of civic, leadership and diversity-related skills; creating platforms for students' meaningful collective engagement with politics (i.e. student activism and formal student representation in university governance); and supporting the establishment and running of advocacy and developmentally orientated student societies; and
- Stimulating students' discursive engagement with politics and public affairs, as well as interaction and meaningful conversations with diverse others.

High-impact practices

The findings invite reflection on what Kuh (2009b) calls 'high-impact practices', albeit focused on the development of citizenship competences. Identifying a set of specific practices with a high impact on citizenship competences is an important step in translating knowledge gained from student engagement surveys into the lived student experience. If well-designed, many of the prominent high-impact practices for teaching and learning success – such as

interdisciplinary first-year seminars on global issues, learning communities, student-faculty research or study abroad (NSSE 2014: 2) – will also have a positive impact on citizenship competences insofar as they correlate with the same academic engagement measures. The HERANA 2 surveys further show that beyond the curricular, there is a critical role to be played by the co-curriculum (particularly, student affairs civic skills training activities), as well as by student politics and volunteering in development agencies and advocacy groups – all of which correlate and co-vary with key competences. Such practices will cumulate with the stimulation of a discursively engaged, diversity-respecting campus culture that is alive with debates on global issues, that stimulates interest in and discussions of public affairs and politics, and that enables meaningful interactions with diverse others, in order to significantly enhance citizenship competences and thus the contribution of higher education to political development and democratisation.

As a starting point for developing high-impact practices, the analysis here proposes to look at the likelihood of particular engagement activities to foster key competences. Table 11.3 illustrates the probabilities of key aspects of student engagement contributing to citizenship competences, based on the partial correlation coefficient matrices calculated for the purpose of this study. It shows that in every one of the four clusters of student engagement there is at least one variable that has very high probability scores for its potential impact on citizenship competences.

Designing high-impact practices involving pedagogies of active and collaborative learning therefore promises a great chance of impacting on citizenship competences (as well as on student retention and success). Moreover, the regression analyses presented in Table 11.2 suggest that there might be a cumulative effect of attending an academic engagement-type high-impact practice *and* a co-curricular high-impact practice, including specific civic and diversity skills training. In both cases, such high-impact practices should involve frequent discussion of global and current affairs topics, and stimulate interaction and meaningful conversations between students from different backgrounds (e.g. in terms of race, class, academic discipline and disability). Finally, the implementation of such high-impact practices should be accompanied by a supportive institutional climate which is perceived as friendly, caring, tolerant and intellectual, and, in particular, that is characterised by high levels of freedom of expression and respect for diversity.

Conducting institutional surveys

The methodology of conducting census-type online surveys with undergraduate students in African universities faces various challenges. Chief amongst these is reliable access for respondents to the online survey platform in terms of access both to on- and off-campus computing facilities, and to WiFi with sufficient bandwidth on campus for access via students' own portable devices (including smartphones). Correspondingly, the online survey platform ought to be hosted on a local server, be compatible with a low-bandwidth environment,

Table 11.3 The probabilities of student engagement contributing to citizenship competences

		University of Cape Town			Makerere University		
		Combined civic and diversity skills	Good citizenship	Support for democracy	Combined civic and diversity skills	Good citizenship	Support for democracy
Institutional culture	Friendly, caring, tolerant, intellectual climate	++	NS	NS	+	+	+
	Respect for diversity on campus	+	NS	+	+++	+	+++
	Freedom of expression on campus	NS	NS	NS	+	+	++
Academic engagement	Active learning	+++	+	NS	+++	+++	++
	Collaborative learning	++	NS	NS	+++	+	+
	Scheduled academic activity	-	NS	+	+	NS	-
	Staff-student interaction (UCT only)	+++	+	NS	n/a	n/a	n/a
	Enriching academic activities	NS	NS	++	++	NS	NS
Co-curricular engagement	Civic skills training	+++	+	+	+++	+++	NS
	Student politics (governance/activism)	++	++	NS	+++	+	+
	Relevant student societies	++	+	NS	++	++	NS
Discursive engagement	Interest in and discussing politics	+++	+++	NS	++	++	+[1]
	Meaningful conversations with others	++	+++	NS	+	NS	+

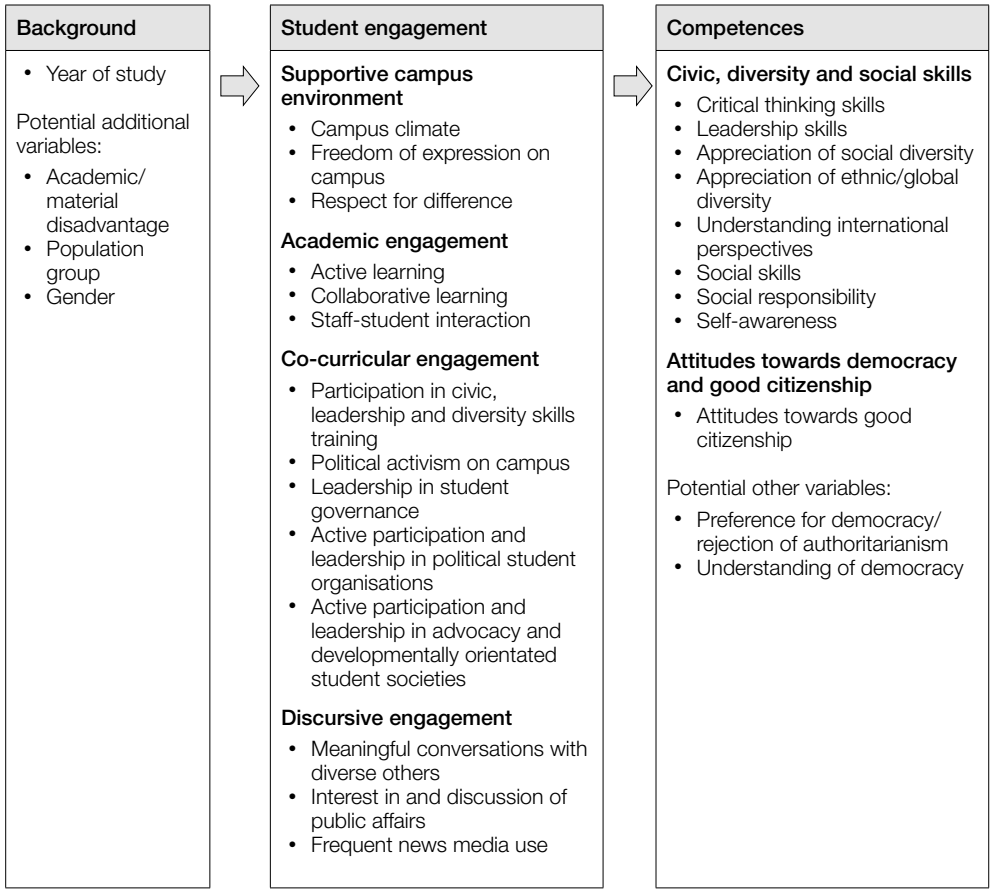
Note: Table indicates highest probability of a relationship between student engagement variables and citizenship competences
Key: NS = p >.0.05; + indicates probabilities as follows: + p = <0.05, ++ p = <0.01, +++ p = <0.001
[1] Media use

and have functionality for the completion of the survey using a smart device, especially a smartphone. Finally, it is advisable to construct a targeted, small but representative sample rather than to attempt a census-type survey.[10]

Finally, the analyses in this chapter provide the basis for revising the original HERANA Citizenship Module, and the revised model is presented as a conceptual map in Figure 11.4. The related questionnaire is available freely as appendix to the full HERANA report on the pilot studies (see Luescher-Mamashela forthcoming).

10 HERANA's successes and challenges of using different kinds of methodologies for conducting student surveys in African universities are discussed in a forthcoming article by Luescher-Mamashela, Mugume and Lange.

Figure 11.4 Schematic concept map of the revised HERANA Citizenship Module



Conclusion

Student engagement is known to correlate well with retention and success but its impact on developing citizenship competences has hardly been studied. The HERANA pilot studies have shown that key aspects of the undergraduate student experience have a profound impact on raising levels of citizenship competences. Exploring different statistical models and indicators of the student experience and competences, this chapter has shown that the best models of engagement explain up to a third of the variation in levels of civic, diversity and social skills, as well as separately between a quarter and two-fifths of the variation in diversity and social skills, leadership skills, and student attitudes towards good citizenship, respectively. The findings, therefore, not only confirm the usefulness of the student engagement construct and the HERANA Citizenship Module for studying and improving the student experience to enhance higher education's contribution to citizenship in Africa, but also provide

evidence of the way that processes of student engagement relate to and enhance citizenship competences. The findings thus invite reflection on what Kuh calls 'high-impact practices'. If well-designed, many of the prominent high-impact practices for teaching and learning success are likely to also have a positive impact on citizenship competences insofar as they correlate with many of the same academic engagement measures. In addition, the HERANA surveys show that there is a critical role to be played in the co-curriculum, and particularly in student affairs civic skills training activity, student involvement in student politics, and student volunteering in student-run development agencies and advocacy groups. These aspects of student engagement cumulate with the stimulation of a discursively engaged, diversity-respecting campus culture that is abuzz with debates on global issues, stimulates interest in and discussions of public affairs and politics, and enables meaningful interactions with diverse others.

In the broader perspective, the study shows that the multiple roles that African flagship universities are meant to play in development – in producing and diffusing new values and knowledge, training highly skilled professionals, and developing competent citizens and democratic leaders for state and civil society – coincide empirically in terms of student engagement. As such, these roles can be fostered *simultaneously* by the adoption of practices with high impact on students' academic success and citizenship competences. The model of political socialisation implicit in the HERANA Citizenship Module does not measure teaching success with respect to specific values (although contextually relevant values could be designed into various civic engagement activities). Rather, it focuses on generic citizenship skills and competences that empower graduates to make a positive contribution to development. Institutional and national higher education policy-makers are hereby provided with a conceptual, methodological and practical tool to enhance African higher education's contribution to development.

In conclusion, two decades of democratisation in Africa have made it possible for flagship universities to play a role in the functions of legitimation, social cohesion and civic education, without contradicting but advancing the aspirational socio-political goals and values anchored in national constitutions and development plans. The more pluralistic macro-political frameworks allow flagship universities to engage in critical-constructive ways with public affairs and politics in their country and region, and to move upstream from operative political culture to advance socio-political development and democratisation.

This chapter provides a methodological framework and indicators for research-based institutional and national policy, in terms of an application of the student engagement construct that broadens the HERANA focus on research-informed policy-making, the institutionalisation of data collection, and the development of comparative indicators to measure, as social outcomes of higher education, a set of generic graduate competences that include citizenship competences such as critical thinking skills, leadership skills, and diversity and social skills.

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CHAPTER 12

MANAGING CONTRADICTORY FUNCTIONS AND RELATED POLICY ISSUES

Nico Cloete, Peter Maassen, Ian Bunting, Tracy Bailey, Gerald Wangenge-Ouma and François van Schalkwyk

Introduction

In Chapter 1, and following Castells (1993, 2009), Cloete and Maassen summarised the four core functions of universities as producing values and social legitimation; selecting the dominant elites; training the labour force; and producing scientific knowledge and supporting its application in society.

In the African context, during colonial domination, which was characterised by an economic model of extraction and exploitation, higher education was not regarded as 'value-adding'. In the postcolonial era, the newly independent African nations regarded universities as important for elite-formation and for training the labour force at the professional level. Development aid, as can be illustrated by the World Bank's 'policy advice' with respect to higher education, did not in any way incorporate producing new knowledge as a function of the African university. And, when they did start regarding universities as important for development, the main focus for development aid was on direct assistance with (community) development. Higher education in Africa thus developed a path dependency that privileged the 'ideological, elite-formation' and 'training the labour force' functions in Castells' (1993) typology of university roles. The 'production of scientific knowledge with application in society' function was not developed. Furthermore, during this time, many of the previously colonised countries, as they moved into the information age associated with knowledge-driven economies, started paying much more attention to the economic and science/innovation functions of their universities.

The recognition of the importance of knowledge and higher education for sustainable development is now global, even though there are contextual and regional differences in the way the relationship between the two evolves. Nonetheless, there are two things that are universal about this relationship. Firstly, the university remains the best and, in many respects

central, producer of self-renewing knowledge-producing capacity. The best index for this is the production of research-based PhDs, associated with research and innovation. Secondly, the university is much better at indirect long-term knowledge capacity-building than direct short-term knowledge application and technology development, a task that many of the new knowledge institutions of the knowledge economy (parastatals, non-governmental organisations and firms) are far more efficient at undertaking (Mazzucato 2013: 52–53).

This confronts Africa with the need to 'catch up' in the form of strategically investing in universities with the aim of producing new knowledge for teaching and for development. Towards the end of the millennium, development aid agencies, including the World Bank, recognised that there is a need to strengthen the knowledge-producing function of the African university system. Two main strategies emerged in this regard: aid to individual academics and students, and the establishment of centres of excellence. Strikingly, both strategies have failed. Aid to individual academics and students contributed to a massive brain drain, or to the phenomenon of academics returning to their national universities where they were not research-productive and seldom happy (Chapter 5). At the same time, the establishment of centres of excellence, located in universities that are not research-intensive, has, with a few exceptions, not produced the expected strengthening of the needed research capacity.

The central argument from the evidence presented in this book is that Africa needs a group of research-intensive or research-led universities. These can be described as academic institutions committed to the production and dissemination of knowledge in a range of disciplines and fields, and equipped with the appropriate laboratories, libraries and other infrastructure that permit teaching and research at the highest possible academic level. Worldwide, such universities play complex roles in their national knowledge systems, including delivering on the core mission of research production; the training of students to engage in research; and producing researchers and academics for other universities and research units (public and private) in the system. A review of the mission statements and the performance of the eight flagship universities[1] in the HERANA study (see Chapter 3) shows that only the University of Cape Town (UCT) satisfied two of the flagship goals – namely, high-output research and scholarship, and delivering knowledge products that would enhance national and regional development – and that Makerere University appears to be moving in that direction.

A number of policy issues were identified that would need to be addressed if the group of HERANA universities, and other similar institutions in Africa, are to become more research-intensive institutions. These issues relate to system-level governance, the academic structure of research-intensive universities, funding and development aid, and research-informed reforms. Before discussing these policy issues, and in the HERANA tradition, we illustrate the problems institutions may face in managing the contradictory functions by looking more closely at three of the flagship universities.

1 The universities of Botswana, Cape Town, Dar es Salaam, Eduardo Mondlane, Ghana, Mauritius, Makerere and Nairobi.

Managing contradictory functions: The universities of Mauritius, Nairobi and Makerere

The three 'illustrative' universities chosen are Mauritius, Nairobi and Makerere. The University of Mauritius is selected because it is located in the only country in the African HERANA group that has a pact and explicit knowledge economy policies. The University of Nairobi and Makerere University are also included because they are both large, well-known African universities that have intentions and policies to become research-led institutions, but that are grappling with trading off enrolment expansion with a focus on the doctorate and research, albeit with somewhat different outcomes.

The University of Mauritius

In Mauritius there was a very explicit role for higher education in development, as articulated in national policy documents such as the Draft Education and Human Resources Strategy and, importantly, the policies formulated in the document *Developing Mauritius into a Knowledge Hub and Centre of Learning* (MESR 2006). As a result of the coordinated efforts of the Ministry of Education, Culture and Human Resources and the Ministry of Finance and Economic Empowerment, the country had made significant progress in translating the policy documents into implementation of the first steps to move the country towards becoming a fully fledged knowledge economy. Mauritius is currently rated the most competitive economy in Africa by the World Economic Forum.[2]

One aspect of a knowledge economy education system that Mauritius has implemented is massification; it is the only country in Africa with a participation rate of more than 25%. This expansion was largely due to an 'explosion' of private providers, mainly from East Asia but also from Europe (and the United Kingdom in particular). However, massification in Mauritius has not been accompanied by differentiation: having about 60 private higher education institutions in a country with around 1.3 million people means a large number of very small institutions doing similar things.

In terms of the four main functions of a higher education system referred to earlier, it could be argued that the University of Mauritius has done well in terms of the function of producing values and social legitimation. Unlike universities in other African countries, there has been very little in the way of staff or student conflicts, or disruptions for extended periods of time, at the institution.[3] In terms of the function of elite formation, the university has certainly been the flagship for the nation – although figures provided by the Mauritius Tertiary Education Commission indicate that significant numbers (17% in 2013) of the children of the

2 Paradise Gained: How Tiny Mauritius Became Africa's Most Competitive Economy. *International Business Times,* 4 September 2013.

3 It could even be argued that this is part of the Mauritius 'miracle' of building a strong state.

elite leave Mauritius to study abroad.[4] This is a problem in many developing countries: in the absence of a high-prestige university, the elite send their high-performing youth abroad. The University of Mauritius is also performing very well in the 'training the university-level labour force' function: not only is the university efficient in terms of undergraduate throughput, the HERANA study on higher education and economic development reported that the costs per graduate in Mauritius are the lowest in the HERANA group (Cloete et al. 2011).

However, the assessment of the University of Mauritius as a flagship university in Chapter 3 shows that the institution met only three of the 13 flagship targets, relating to its proportion of students in science, engineering and technology (SET), and to its throughput rates of masters and doctoral graduates. Furthermore, the institution exhibited a number of weaknesses in relation to knowledge production, for instance:

- Over the five-year period 2007–2011, total enrolments had grown by 26% (from 7 807 to 9 864), while enrolments at the masters level had increased slowly (12% in 2011 compared to 2007) and growth at doctoral levels had been stagnant (0% over the period).
- The proportion of head count undergraduate students had remained around 90% for the period. Doctoral graduate totals increased between 2007 and 2011, but had reached only 15 in 2011. The ratio of masters-to-doctoral enrolments increased from 15:1 to 19:1, meaning that the throughput from masters to doctorates declined, and this ratio is much higher than the target of 5:1.
- The total number of tenured academic staff increased by 43%, and the total number of academics with PhD degrees grew from 90 to 121 (33% increase), between 2007 and 2011.
- Even more problematic is that research publication output remained low relative to the number of academic staff employed, even though the HERANA project data indicates that the number of academic publications did increase from 36 in 2007 to 63 in 2011 (75%, from a very low base). The updated data from Chapter 4 shows that in terms of Web of Science publication outputs, Mauritius increased from 23 in 2001 to 74 in 2013, an increase of 222%, but that over the same period Makerere had increased by 539% and Eduardo Mondlane by 307%. The outputs per academic staff member in terms of research publications and doctoral graduates at the University of Mauritius were therefore low in comparison to the other HERANA institutions.

In summary, the assessment of the University of Mauritius shows that despite Mauritius being the only country in the HERANA project that had a pact of policies and strategies to be a leader in the knowledge economy, without a policy of differentiation in the higher education system the university has not been able to make a trade-off between being a largely undergraduate teaching institution and a research-led flagship university. In other words, the contradictory

4 Tertiary Education Commission data provided by Praveen Mohadeb (6 January 2015).

functions of training for the labour market and producing (and applying) scientific knowledge have not been managed in a way that allows the university to assume a role as a producer of new knowledge in the knowledge hub.

The University of Nairobi

In Kenya, the Kenya Education Sector Support Programme, together with the Ministry of Higher Education, Science and Technology's plan for 2008–2012 and the Medium Term Plan 2009–2030, are the key policy documents that set out the government's vision on the role of higher education and the commitment to the knowledge economy. The development planning document, Vision 2030, is intended to stimulate the implementation of this ambitious policy vision.

The University of Nairobi has started a debate about becoming a research university and has taken some steps towards this goal, such as establishing an office for a deputy vice-chancellor for research; appointing a director of research; increasing research funding; introducing recognition and incentives for outstanding researchers; and strengthening support for postgraduate research. The university has also developed a number of strategic goals with associated performance objectives, which include projections pertaining to masters and PhD programmes, journal publications, papers at conferences, and research grant portfolios (Waweru & Otieno 2014).

Regarding the role of producing values and social legitimation, the University of Nairobi is an example of an institution with a history of conflict and contestation, with extensive periods of closure owing to student and/or staff strikes. The report on the student survey conducted at the university as part of HERANA Phase 1 characterised the institution as a 'political hothouse' (Luescher-Mamashela 2011). Furthermore, it reported that compared to the general Kenyan population, students at the University of Nairobi had more radical views on politics including, for example, very liberal views of what democracy is (as a political system of political and civil rights); high levels of preference for democracy and a rejection of authoritarian rule (especially high was the rejection of presidential authoritarianism); and, strikingly, the highest levels of criticalness towards the political system of any student surveys ever conducted by HERANA. What also emerged is that the ethnicisation of politics under the Kibaki government, and the subsequent 2007/2008 post-election violence, had 'infected' student politics. As in other African flagship universities, the role of national political parties is highly problematic in student politics – not only because student leaders become part of party-based patronage systems, whereby their affiliation and loyalty to the party is ultimately rewarded with jobs in government or the party upon graduation, but also because these party systems tend to follow ethnic cleavages, thus 'institutionalising' inter-ethnic competition for the spoils of politics.

In terms of the elite-formation function, the University of Nairobi was, for a long time, the institution of choice for the children of the elite. But this position has been eroded by the introduction of private students and the establishment of private universities such as the

United States International University and, in the public sphere, Moi University, Kenyatta University and the Jomo Kenyatta University of Agriculture and Technology.

While the University of Nairobi has fulfilled the role of training large numbers of professionals, there have also been issues raised by a number of human resource commissions about the adequacy and relevance of the training. For instance, the Director of the Federation of Kenya Employers reported that his Federation was questioning the quality of education offered in Kenyan universities (Ramah 2013). In particular, he charged that many university administrators were compromising the quality of education by accepting students without improving campuses' capacities to absorb them, and that they were mainly considering financial gains when expanding their education programmes. The Director added that the Federation would like to see universities specialise in particular fields – in contrast to the current situation where all the universities are offering degrees in every field so that they can cash in on as many students as possible (ibid.).

The assessment of the University of Nairobi as a flagship university in Chapter 3 shows that the university met only two of the 13 flagship targets: a favourable ratio of full-time equivalent (FTE) students-to-academic-staff in SET programmes, and its throughput rate of doctoral graduates. The assessment also highlights the areas in which the university appears to be facing serious challenges, which include the following:

- While Nairobi had substantial increases in masters students – 6 145 in 2007 to 11 807 in 2011 (an increase of 92%) and doctoral students from 62 in 2007 to 255 in 2011 (an increase of 311%) – the percentage of doctoral enrolments to total enrolments is 0.3% as opposed to 4.0% at UCT. Despite this increase, 255 doctoral students in a university of over 40 000 students remains low.
- Similarly, while the doctoral graduate totals increased from 32 in 2007 to 61 in 2011 (91%), 61 graduates for such a large institution is low by international standards. More problematic for Nairobi is that the ratio of masters-to-doctoral enrolments was 48:1 in 2009 and 46:1 in 2011 (the target ratio is 5:1). The implication of this is that a disproportionally large number of masters degrees are 'terminal', meaning that students do not progress to the doctoral level.
- In contrast to this growth, the total number of permanent academic staff remained flat, from 1 292 in 2007 to 1 382 in 2011 (7%), as did the total of academic staff with PhD degrees, which increased only slightly from 581 in 2007 to 636 in 2011 (9%). This means that basically the same staff complement had to deal with an increase of 47% in masters and doctoral students.
- Research publication totals also remained low relative to the numbers of academic staff employed but, as shown by the HERANA data, the number of academic publications did increase from 105 in 2007 to 198 in 2011 (89%). The 2013 update in Chapter 4 shows that Nairobi's academic publication output on the Web of Science increased from 131 in 2001 to 248 in 2013 (73%). This is the lowest increase for all the HERANA

institutions; by contrast, Makerere increased by 539%, Eduardo Mondlane by 307% and Ghana by 229%. Overall, the University of Nairobi's scores below the flagship targets and the flagship averages were the institution's throughput of total graduates, its throughput of masters graduates, its outputs of research publications per academic, and its outputs of doctoral graduates per academic.

In Chapter 7, Wangenge-Ouma et al. report that the research incentive regime at the University of Nairobi was regarded as weak by the academics surveyed, and that it was failing to encourage the maximisation of the university's research goals. While there were multiple principals who were rewarding research activities, academics were also confronted with other principals who were reinforcing non-research behaviour. Such principals included development aid agencies and government departments that offered significant rewards for consultancies. In addition, the university itself was incentivising teaching on the full-fee-paying stream by providing additional payments, over and above regular salaries, to academics who taught on these programmes. The general perception of academics was that the incentives were inadequate, discontinuous and not systematically applied across the institution.

In terms of policies and the setting of performance goals, the University of Nairobi was clearly showing a serious intention to strengthen knowledge production. However, in terms of its undergraduate teaching and income-generation mission, the university's enrolments grew from 36 788 in 2009 to 61 466 in 2011 and 80 209 in 2013 (Waweru & Otieno 2014). This 118% increase in overall enrolments and 47% in masters and doctoral enrolments was quite in contradiction to the increase of 6.9% in permanent staff and the 9.4% increase in staff with PhDs.

In summary, Nairobi is an interesting example of a university that is trying to resolve the tensions of enrolment expansion (earning more income) and developing a stronger research postgraduate function, but without a supporting government policy framework. However, from the research and doctoral output figures it is clear that the staff complement cannot cope with the contradictory pressures.

Makerere University

Makerere University's current strategic plan (2008/2009–2018/2019) ties itself closely to the institution's role in national development. The formulation of the plan was guided by the question: How can Makerere University reposition itself to meet emerging development challenges in Uganda? The plan took into account a range of socio-economic, political and environmental concerns, including an overview of shifts in the Ugandan economy with specific reference to the move towards a knowledge economy and the role that Makerere can play in this regard. The plan aligns itself with a number of national policies including the National Strategic Plan for Higher Education and the Uganda Poverty Eradication Action Plan.

In fulfilling the role of providing values and social cohesion, Makerere was certainly part

of what Castells (1993: 74) regarded as the instability of the conflicting and competing elites. According to Mugume and Katusiimeh (forthcoming), elite competition has continued into the current period where the reintroduction of multiparty politics (bounded by the dominance of the National Resistance Movement as ruling party) has translated into student guild politics at Makerere University in terms of high levels of inter-party competition and related patronage of student leaders. As in other African countries, these parties tend to be ethnic-based. Thus, inter-ethnic competition for political spoils is part of students' socialisation experience. Conversely, the incidence of student protests and closures at the university has been reduced with the admission of large numbers of private (fee-paying) students, whose interests dominate Makerere guild politics and who fear being expelled and losing their student fees already paid (ibid.). However, the student surveys conducted at Makerere University as part of HERANA Phase 2 (see Chapter 11) show that the university is beginning to offer a 'training ground' in democratic citizenship in terms of developing key competences such as critical thinking, leadership skills, and diversity and social skills. This happens less through student politics and more through the creation of an institutional culture that is perceived as open, with pedagogies of active and collaborative learning, and active skills training.

According to Mamdani (2007), while Makerere certainly started out with the function of providing training for a privileged elite on full scholarships, the elite status of the institution was seriously undermined after the World Bank structural adjustment period and the subsequent privatisation and commercialisation of the university. Nevertheless, with regard to training the new professional class, Makerere has been the uncontested flagship university of Uganda.

Regarding knowledge production, as will be seen in the section on the pact later in this chapter, Makerere and the universities of Botswana and Mauritius were the only HERANA institutions where the institution's role in economic development was explicitly articulated in their respective strategic plans. In addition, Makerere and the University of Ghana were the only universities where the staff seemed more aware than the national government of the importance of the role of the university in the knowledge economy (Cloete et al. 2011).

Makerere's strategic plan has three pillars: becoming a research-led university; transitioning from a teacher-centred to a learner-centred institution; and making a paradigm shift from outreach to knowledge transfer (Nakayiwa-Mayega 2014). In order to move towards a research-led institution, Makerere instituted a number of strategies and structures, including the establishment of a directorate of research and graduate training; strengthening institutional planning with a new director (who, in addition to considerable experience, has a PhD in higher education studies); developing a framework for research management that emphasises a new management style and internationalisation; and developing a research monitoring framework that includes publications, research income, number of doctoral students, and research incentives (promotion and monetary). Finally, the plan exhibits the conscious promotion of a 'flagship' discourse (which has been self-reinforcing) for national

and international partnerships, coupled with creating a number of centres of excellence through partnerships (ibid.).

The assessment of Makerere University in Chapter 3 shows that the institution met four of the 13 flagship targets. These relate to its favourable ratio of FTE students-to-academic staff in SET programmes, as well as the throughput rate of total graduates, SET graduates and masters graduates. The assessment also showed that over the period 2007–2011, Makerere had faced eight specific challenges, including the following:

- Makerere's proportions of masters-plus-doctoral students and of doctoral students were below the flagship targets and, in the case of masters-plus-doctoral enrolments, below the average for the eight flagship universities.
- Its performance fell below the flagship target and the average for the eight flagship universities in terms of the provision of senior academics and of academics with PhD degrees.
- Other weaknesses that resulted in scores below the flagship target and the flagship averages were its student-to-staff ratio in programmes other than SET, its throughput of doctoral graduates, and its outputs per academic of research publications and of doctoral graduates.
- Of particular concern for Makerere's ambition to become a research university is that it has remained a predominantly undergraduate university: in 2009, 91% of the student body was at the undergraduate level and this proportion had only dropped to 90% by 2011 (compared, for instance, to 68% at UCT). Nevertheless, masters enrolments grew from 763 in 2007 to 1 705 in 2011 (123%) and doctoral enrolments from 32 to 563 (1 659%) over the same period. Even more impressive is the 3:1 ratio of masters-to-doctoral enrolments (the same as UCT). From this we can conclude that the institution is managing growth at both the undergraduate and postgraduate levels, much more so than the University of Nairobi.
- The total number of permanent academics remained flat, from 1 179 in 2007 to 1 209 in 2011 (3%), as did the total of academics with PhD degrees, which increased only slightly from 365 in 2007 to 375 in 2011 (3%).
- Research publication totals have remained low relative to the number of academic staff employed but, according to the HERANA data, the number of publications did increase from 233 in 2007 to 382 in 2011 (64%). The updated Web of Science review in Chapter 4 shows that Makerere's publication output went from 84 in 2001 to 460 in 2013, an increase of 539%, which is substantially the highest of all eight HERANA institutions. Of particular relevance is the post-2008 period (of the new research strategy) during which publications increased by 90.8% (241 to 460) over the five-year period. This is an average annual growth of 13.8% (in contrast to UCT's average annual growth of 7.7%).

In Chapter 6, Musiige and Maassen report that Makerere can do more to stimulate the development of a stronger research culture. They suggest that the human resource policy should go beyond stimulating academic staff members with PhD degrees to engage primarily in teaching. At present, tenured academic staff have little accountability regarding research. Furthermore, Makerere could stimulate the strengthening of an institutional research culture by introducing adequate incentives and rewards for academics who engage in research. Another major issue is that the nature of the research funding practice contributes to making research an individualised activity. There is hardly any collective (i.e. institutional) component in research funding at Makerere, implying a loose coupling between the institutional research ambitions and strategies, and the individual academic staff members' (lack of) engagement in research activities.

The positive changes at Makerere highlighted above came about despite the national research system, which is characterised by Nakayiwa-Mayega (2014) as having a limited national policy framework, fragmented support, and the absence of a comprehensive national funding system for research (higher education research is part of the Ministry of Education and Sports, and the national budget for research and development (R&D) is less than 0.3% of Uganda's gross domestic product).

While Makerere's overall research outputs are still low in international terms, the improvements in doctoral enrolments and graduation, and in research productivity, do represent remarkable increases from the low starting base. These improvements also show that institutions with determined strategies and structural changes (such as capping undergraduate growth and increasing doctoral enrolments while curbing masters-level growth) can bring about change, even in adverse conditions. However, there are national (e.g. the lack of a coherent research policy framework) and institutional (e.g. the incentives for teaching privately sponsored students) factors that mitigate against strengthening an institutional research culture.

In conclusion, four key points can be extracted from the discussion of the problems faced by the three 'illustrative' universities in managing contradictory functions. Firstly, these institutions have had mixed success in fulfilling the functions of 'values and social legitimation' and 'elite-formation'. Secondly, in terms of awareness and policies, and some structural changes, all three are committed to strengthening the knowledge production function. Thirdly, what Mauritius shows is that even where a pact and policies are in place, if there is not a deliberate commitment to differentiation at both the national and institutional levels, the functions of undergraduate training will continue to dominate. Finally, despite strong institutional commitments to strengthening research at both Nairobi and Makerere, without national support that can curtail the strong pressure for fundraising through expanding undergraduate enrolments, the institutions will not be able to manage the contradictory functions of undergraduate training and knowledge production.

Policy issues

Based on more than six years of theoretical and empirical work, a number of key policy issues have been identified which African governments, universities, other higher education actors and development aid agencies will need to address if the intention to develop a group of research-intensive universities in Africa, which can produce new knowledge with global and local impact, is to be realised. This set of policy issues relates to system-level governance; the academic structure of research-intensive universities; institutional and governance capacity; development aid funding; and the need for research-informed reforms.

System-level governance: Pact and differentiation

Our starting point is the importance of the university *system* (and not just individual institutions) and, within this, system-level governance with regard to the development of research-intensive universities in Africa. At the system level (see Chapter 9), higher education governance refers to institutional arrangements (frameworks, structures, resources etc.) involved in the direction, planning, management and coordination of institutions and the sector as a whole, and involves a range of stakeholders involved in policy-making and implementation. A core component of governance is the efforts undertaken to move the sector and institutions in the direction indicated by particular higher education (and national development) goals. For this to be successful, a range of governance functions and mechanisms have to be in place, such as the development and maintenance of a pact; policy development and strategic planning for the sector (and hence institutions); the monitoring and evaluation of implementation; the development and use of regulatory frameworks and policy instruments, and setting targets for the sector; and the coordination of knowledge policies and activities.

A key problematic in terms of the development of research-intensive universities in Africa is how the higher education system is structured to deal with the formation of a pact to implement a policy of differentiation because, without a differentiation policy, there cannot be research-intensive universities (Birnbaum 1983). We unpack the issues relating to the pact and differentiation below.

Pact

One of the first steps in the HERANA project was to gain a better understanding of the relationship between higher education and development in an international context. To this end, case studies of two countries (Finland and South Korea) and one state in the United States (North Carolina) were undertaken, all of which are part of the OECD but on different continents (see Pillay 2010). One of the main reasons for choosing these states for closer study was that in all cases there was evidence of a strong and close relationship between education, and within this higher education, and economic development. Furthermore, all three states had undergone a major rethink of their economic policies and had put in place strategies and

policies to link higher education to economic development. As such, in each of these states there was a strong, agreed-upon framework for economic development that was aimed at stimulating an advanced, competitive knowledge economy, with an important role for higher education in this regard. Despite major contextual differences, the three states exhibited the following conditions for harnessing higher education for economic development (Cloete et al. 2011: 12):

- Their higher education systems had been built on a foundation of equitable and quality schooling and an emphasis on achieving high-quality higher education;
- They had achieved very high participation rates in higher education (all three over 80%);
- The higher education systems were differentiated in terms of public/private providers as well as different types of institutions (e.g. specialised universities, colleges and polytechnics, in addition to more traditional research-intensive universities);
- Governments and/or national committees coordinated links between economic and (higher) education planning;
- There were effective partnerships and networks between the state authorities, higher education institutions and the private sector to link education and training, and research and innovation; and
- There was strong state involvement in a number of other respects including, for example, adequate state funding for higher education; using funding to steer the higher education sector to respond to labour market requirements; and incentivising research and innovation in the higher education sector.

Based on the three international case studies, as well as case studies of the role of universities in economic development in the eight African HERANA countries, Cloete et al. (ibid.) concluded that one of the key conditions for stimulating effective university contributions to development is the existence of *a broad pact between government, universities and relevant socio-economic actors about the nature of the role of universities in development*. A pact has been defined by Gornitzka et al. (2007: 184) as:

> *A fairly long-term cultural commitment to and from the university, as an institution with its own foundational rules of appropriate practices, causal and normative beliefs, and resources, A pact is different from a contract based on continuous strategic calculation of expected value by public authorities, organised external groups, university employees, and students – all regularly monitoring and assessing the university on the basis of its usefulness for their self-interest, and acting accordingly.*

In order to explore the extent to which a pact was evident in the eight African higher education systems, the HERANA Phase 1 project (see Cloete et al. 2011) collected and analysed an

array of both documentary and interview data during 2010. At the national level, documents included policies, plans and/or strategies for development, higher education, and science and technology, and interviews were conducted with a range of national stakeholders, including representatives of the ministries responsible for higher education, finance/economic affairs, and science and technology, as well as the higher education councils/commissions. At the institutional level, data consisted of key documents such as strategic plans and research policies, and interviews with university leaders, including the vice-chancellor and/or deputy vice-chancellors, heads of research and institutional planning, and senior academics.

The research concluded that none of the eight African countries had a clearly articulated development model or strategy. Some countries (e.g. Uganda, Botswana and Mozambique) had national development plans; others (e.g. Ghana and Mozambique) had poverty reduction strategies; and a number of countries had national visions – usually focused on some point in the distant future.[5] However, these did not constitute development strategies that were broadly accepted and implemented across different ministries. One exception was Mauritius, which had what came closest to a fully-fledged development model, with its generally agreed-upon national vision and associated array of policies for a knowledge hub, but as yet without the requisite coordination, implementation and monitoring powers. The other countries were characterised by frequently changing national priority announcements, often around the budget speech, and a plethora of non-complementary policies in different centres of power.

In the absence of clear development strategies, the researchers looked at a range of policies and medium- and long-term budget plans from different government departments, in order to ascertain whether these featured the notion of the knowledge economy and a role for higher education in development. Similarly, universities' strategic plans and research policies were consulted to see whether the concept of the knowledge economy and a role for the university in development were articulated. At the national level, Kenya and Mauritius, followed by Mozambique and Tanzania, exhibited the strongest awareness of the concept of the knowledge economy and a role for higher education in development. However, with the exception of Mauritius, this awareness was not reflected across policies, but was predominantly found in the science and technology policy or in the long-term national vision. Most problematic, again with the exception of Mauritius, was that the concept of the knowledge economy and a role for higher education in development were mostly absent from the policies of ministries responsible for higher education. At the institutional level, the knowledge economy was explicitly articulated in the policies or plans of the universities of Botswana, Mauritius and Makerere. None of the universities had specific policies regarding the institution's role in economic development, although this role was embedded in the strategic plan and/or research policy of the universities of Botswana, Nairobi, Mauritius and Makerere.

Without a pact on the role of higher education and universities in the knowledge economy,

5 Examples included the Tanzania Development Vision 2025, Botswana Vision 2016, Ghana Vision 2020, Mozambique's Agenda 2025, Kenya Vision 2030, and the South African National Development Plan 2030.

a foundation is lacking for the development and implementation of a clear and effective policy and strategy for differentiation, which is a condition for the development of a group of research-intensive universities in the system.

Differentiation

To start with, in terms of the different roles of universities, Castells (1993: 73) observed that 'because universities are social systems and historically produced institutions', they undertake all of the four functions discussed earlier simultaneously within the same structure, although with different emphases at different historical moments. Castells (ibid.) concludes that the 'critical element in the structure and dynamics of university systems is to combine and make compatible seemingly contradictory functions'. The challenge, then, is to develop institutions that will be strong and dynamic enough to withstand the tensions inherent in these contradictory functions, while at the same time being able to respond to what they see as their specific 'mission' or task in a particular moment in the history of the system. Furthermore, the fulfilment of different functions cannot be resolved within individual universities alone; ideally, they need to be distributed throughout a system, with particular institutional types undertaking different combinations of functions.

It is in determining these combinations that a prevailing debate and contestations arise in relation to differentiation. In the African context, the issue of diversity and differentiation was discussed at an international seminar that was part of the Centre for Higher Education Transformation's (CHET) 10th anniversary in 2007.[6] Providing an international perspective, which formed the basis of a book on differentiation in higher education (Van Vught 2009), Frans van Vught (2007: 5–6) argued that differentiation has the following positive effects for higher education systems:

- It improves access for students with different educational backgrounds and achievements;
- It enables social mobility by offering different modes of entry into higher education, multiple forms of transfer, and upward as well as 'honourable downward' mobility;
- It can meet the needs of the labour market by creating a growing variety of specialisations that are needed for economic and social development;
- It serves the needs of interest groups by allowing many to develop their own identity and political legitimisation; and
- It permits the crucial combination of elite and mass higher education: mass systems are more diversified than elite systems as they absorb a heterogeneous clientele and try to respond to a range of demands from the labour market.

6 For further information on CHET seminars and research outputs on differentiation, see http://www.chet.org.za/research-areas/differentiation.

Van Vught (ibid.: 6) concluded that despite these obvious advantages, in recent decades tertiary systems around the world had been becoming less diverse and differentiated. He attributed this to a combination of uniform (one-size-fits-all) government policies that tend to drive towards homogenisation, and the ability of powerful academic communities to defend their norms and aspirations (ibid.: 6, 14).

At the same CHET seminar, Njuguna Ng'ethe from the University of Nairobi reported on one of the first (and only) systematic studies focusing on differentiation in Africa (see Ng'ethe et al. 2008). This World Bank-sponsored investigation covered higher education systems in 12 African countries and, for comparative purposes, Korea, Singapore, Chile, the United Kingdom and France. Significantly, Ng'ethe observed that the expansion of higher education in Africa had not been accompanied by differentiation; instead, there was evidence of institutional isomorphism whereby newly-established institutions tended to replicate the dominant 'mother' university (MacGregor 2008). In other words, the impulse was for universities to become more and more alike, rather than to develop diverse missions.

Ng'ethe highlighted four aspects that contribute to the trend towards institutional homogenisation in Africa (ibid.).[7] Firstly, in most African countries, higher education funding is based on total student enrolments. Thus, even if an institution starts out with the intention of specialising in a particular area, in a context of low regulation, institutions are free to add other academic programmes, which are often money-spinners (meaning cheaper but popular). This can have the effect of undermining the potential for differentiation. Secondly, the uniform approach to institutional governance, in which institutions are established in the same way and under similar laws, does not allow for differentiation in governance mechanisms. If this is added to the undifferentiated government funding mechanism, then there is a great homogenising pressure. Thirdly, a phenomenon in African higher education is that of off-shore (private) providers. While these institutions do introduce some level of differentiation by offering degrees from other countries, they also offer popular courses in money-making areas (e.g. business administration or information and communication technology). In this regard, Ng'ethe concluded that 'overseas universities are not driving a high level of differentiation' (ibid.). Finally, even when it appears that there are different types of institutions as reflected in different nomenclature (e.g. 'universities of technology'), more often than not, the curricula are not very different across these apparently different institutional types. The same can be said of academic programmes where different course titles belie otherwise very similar content.

An important question in this is whether differentiated systems are more likely to be created by a strong, regulating government, or by autonomous institutions operating in market-like settings. As the studies referred to earlier show, the situation in Africa is not different from elsewhere; that is, autonomous higher education institutions do not attempt to develop a profile which is different from all other higher education institutions. Instead of

7 Ng'ethe's focus on the issue of differentiation in the African context was mainly on size and shape (programme/curriculum) differences, with little attention to differentiation in terms of knowledge production (doctoral education and research output) which is the core focus of the HERANA project.

looking for a fitting niche, each institution is driven by income- and status-maximisation. As a consequence, higher education institutions are naturally inclined to mimic other successful institutions, thereby effectively limiting system-level differentiation. These change dynamics can only be moved in a differentiation-enhancing direction through effective governmental policies and regulations. Unfortunately, as the HERANA data show, the current situation in Africa deviates from this emerging understanding of the factors that stimulate system differentiation in higher education. Firstly, governmental policies aimed at increasing the capacity of the higher education system by establishing new universities have, in general, used one basic university model in this, implying that the new universities have become 'clones' of the existing university/universities. Secondly, public and private institutions that had the level of institutional autonomy that would allow them to develop unique profiles have, in general, combined mimicking and budget-maximising behaviour (e.g. in the form of recruiting large numbers of private fee-paying students).

Furthermore, from the earlier discussion it is clear that a pact and appropriate policies are a necessary, but not sufficient, condition for differentiation that produces a research-intensive institution. There are no easy World Bank-type prescriptions for countries on how to achieve differentiation, particularly not in Africa where it has not been done before. What may be instructive in this regard is a brief summary of the debates and developments relating to transformation and differentiation that have been taking place in South Africa.

In South Africa, the National Commission on Higher Education (1996) declined to address the issue of differentiation because it was so divisive. In 2000, the newly established Council on Higher Education put forward a bold proposal for a four-'institutional type' system, ranging from institutions that would do only undergraduate teaching to universities that would focus more on postgraduate teaching and research. The then Minister of Education and the majority of institutions rejected this proposal; instead, a proposal to restructure the 'apartheid' landscape with institutional mergers was put forward and implemented by government (see Chapter 3).

In 2006, CHET initiated a series of differentiation debates linked to research on performance indicators for the South African system.[8] The title of the most recent seminar (November 2014), 'Edging Closer to Differentiation in Higher Education',[9] tells the story 14 years after the Council on Higher Education made its proposal. The dilemma of differentiation was well summarised by Thomas auf de Heyde in the discussion at the seminar. He reported that on aggregate over the past five years, of the 12 000 lecturers and senior lecturers currently in the university system – the band in which 'emerging researchers' would typically be found – only about 600–650 (just over 5% of the cohort) received research funding from the National Research Foundation annually. This shocking figure shows the 'brake' on research productivity for the new talent coming into the system. Muller (2014) argues that the answer to why more new-entry academics are not applying for grants can be found in the deep fissures that divide

8 See CHET website: http://www.chet.org.za/events.

9 See Muller (2014) for an overview of this seminar.

academia in South Africa. On the one hand, those who prioritise development argue that more resources should be allocated to the institutions with a demonstrated track record of producing active researchers, which will give the system a sustained and sustainable push. The counter-argument, from those who privilege transformation, is that all available resources should be directed to the institutions that do not (yet) have the capacity to develop active researchers – meaning all universities must become research universities.

Within the context of this standoff, South Africa is very close to having a pact on the need for a diverse and differentiated system. As was pointed out in Chapter 5, the National Development Plan and the Department of Science and Technology have policy positions supporting strong research universities. The 2013/2014 White Paper of the Department of Higher Education and Training states that policy and funding will ensure that where quality of teaching and/or research in the system is high, this level will be maintained and improved (see Bunting 2014a). During 2014, a wide agreement emerged about the need for differentiation: the National Development Plan in the Presidency states it unambiguously; the Department of Science and Technology is implementing it with competitive funding; and the Department of Higher Education and Training supports it through funding for research publications as well as substantial funding for enrolling and graduating doctoral students.

However, the Department of Higher Education and Training seems to be paralysed in putting a comprehensive implementation policy on the table. During HERANA Phase 1, the research group came to the conclusion that the widely held common-sense notion that Africa has many good policies but not the capacity to implement them, is not entirely true. For a start, there are many poorly conceived policies that have simply been cut-and-pasted from similar policies in 'successful' countries. Secondly, the capacity is not as weak as is often assumed: in a number of the ministries in the eight HERANA countries, we encountered very well qualified and experienced bureaucrats. Three main problems that paralyse implementation are: inappropriate policy-mimicking; frequent policy changes by successive ministers (every new minister wants a new policy); and, as is the case in South Africa, disagreements between the minister and bureaucrats, disagreements amongst bureaucrats and, not to forget, disagreements between university leadership.

Two clear lessons can be learnt from the South African case. Firstly, it is important to have an ongoing debate that includes government departments (beyond just the education department), university leadership and research organisations. Secondly, it is very important to provide research-based information about the performance of the system: if the policy discussion is not informed by evidence it will simply oscillate between different ideological positions.

System governance: The role of government agencies

As highlighted earlier, in his lecture on the *Role of Universities in Development, the Economy and Society,* Manuel Castells emphasised the importance of a university system and observed that 'the quality, effectiveness and relevance of the university system will be directly related to

the ability of people, society and institutions to develop' (Castells 2009). The case studies of the three African flagship universities discussed earlier in this chapter illustrate that neither a university, nor a government, can alone bring about a differentiated system that includes research-intensive institutions.

In Chapter 9, Bailey concludes from the study of higher education councils that there was evidence of a shift from a state control approach to a state supervision model of higher education governance in all eight countries. This is a very significant and positive development in sub-Saharan Africa. A state supervisory system is characterised by 'multi-level multi-actor' governance, which includes the redistribution of decision-making powers, responsibilities and accountability among external and internal stakeholders. The governance architecture in such systems consists of a parent ministry (and its relevant department or unit) with overall responsibility for policy-making, strategic planning and ensuring compliance; semi-autonomous agencies responsible for, amongst others, policy implementation, distributing and monitoring public funds, external quality assurance and regulation (including setting norms and standards), monitoring and analysing, and providing expert advice; and informal national-level forums, comprising different levels of institutional leadership, which can make proposals to the parent ministry regarding the development of the sector.

A strong indicator of the move towards a state supervisory approach to governance is the emergence of specialised, semi-autonomous government agencies in what is often referred to as the process of 'agencification'. Here, the main motives for the establishment of such agencies include demands on governments for greater efficiency, responsiveness, transparency and accountability; decreased political interference in governance matters; and enhanced technical expertise and the specialisation of functions. In this book, we report on two extensive studies of such types of bodies in the eight HERANA countries and in 17 sub-Saharan countries, namely, higher education councils/commissions and national research/science granting councils, respectively.

The study on higher education councils (Chapter 9) concluded that factors that were inhibiting the ability of the national councils/commissions to carry out their governance roles more effectively related to a lack of capacity and appropriate expertise; the lack of comprehensive and up-to-date data; the absence of the necessary leverage or sanctions to compel institutions to meet their targets; and the absence of a pact and system-level coordination to guide the work of the councils/commissions within the overall system. Key policy issues identified were the need for a more detailed national plan for the tertiary/higher education system in each country; a review of governance roles and coordination at the system level; capacity-building and identification of expertise; the location (government or agency), development and maintenance of higher education management information systems; and greater clarity regarding autonomy and political independence – that is, a better understanding and acceptance of the need for agencies to have an adequate degree of operational autonomy (Braun 2008a).

The study of science (research) granting councils (Chapter 8) concludes, amongst others, that the relatively low investment in R&D in many sub-Saharan Africa countries, which has

a direct impact on the science funding models, points to different 'inscriptions' of science in different countries and different values afforded to science. On the one hand, some governments clearly recognise the value and importance of science and hence invest in science funding and in the establishment of a national funding agency. On the other hand, many governments have not – at least until very recently – judged science to be of sufficient value and importance to invest in the establishment of a relatively autonomous agency to disburse state funds for R&D. But, the fact that there has been a surge of interest in the recent past in reformulating existing science policies and in the establishment of a separate ministry of science may be indicative of a change even amongst the latter categories of countries. Both Chapters 6 and 7 (dealing with incentives) corroborate the findings in Chapter 8 that there is an urgent need for greater investment in science and the restructuring and strengthening of the research systems in the countries studied.

Academic structures within the university

The key academic structures of a university are its study programme and qualification mix (PQM), the student enrolments and graduates related to the PQM, and its academic staff complement. The elements of these structures are defined and explained in Bunting (2014b).

Student enrolment plannning is essential to the maintenance of the academic structure of any university. A student enrolment plan must monitor the flows of students entering and exiting a university, and must, in addition, deal with:

- Time frames for the introduction of new academic programmes into, and the deletion of existing academic programmes from, the PQM of the university; and
- The student enrolment and graduation targets that a university is expected to meet – either by its internal governing structures, or by an external authority such as a government ministry or higher education council or commission.

The report *An Empirical Overview of Eight Flagship Universities in Africa: 2001–2011* (Bunting et al. 2014: 31) raises questions about whether there is evidence that all the flagship universities had even limited student enrolment plans in place during the period 2001–2011. Were the changes that occurred in enrolments over the period the result of the implementation of an enrolment plan of the kind summarised above, or were they unplanned institutional responses to student demand pressures? The analyses in the report express doubts about the existence of enrolment plans at most of the flagship universities, for reasons of this kind:

- Total student enrolments at the eight flagship universities doubled between 2001 and 2011. There were, however, unexplained differences between the average annual growth rates of individual universities. For example, the average annual growth rates in total enrolments between 2001 and 2011 were: 13% for Ghana, 12% for Eduardo

Mondlane and 10% for Nairobi. More moderate average annual growth rates recorded over this period were: 4% for Cape Town, 3% for Botswana and 2% for Makerere.

- The average annual growth rate between 2001 and 2011 in the total academic staff of the eight flagship universities was 4%, which was approximately half of the 7% average annual growth rate in head count student enrolments between 2001 and 2011.
- Data show that large proportions of the enrolment growth occurred in business and management programmes, and lower proportions in SET programmes. The data show further that academic staff resources were not redistributed during this period of differential growth. The pattern seen at several of the flagship universities was that of highly favourable FTE student-to-academic staff ratios remaining in place in SET programmes, with ratios in business and management programmes becoming or remaining unacceptably high. This can be seen in the 2011 FTE student-to-academic staff ratios at Nairobi (science and technology 15:1, business and management 150:1) and Ghana (science and technology 10:1, business and management 51:1).

Because of the demands of high-level knowledge production, a university's student enrolment plan should pay specific and detailed attention to the aspects that deal with masters and doctoral programmes and students. It should indicate what is to be done with under-subscribed masters and doctoral programmes, and what the minimum and maximum enrolments in a programme should be. The enrolment plan should also set targets for the proportions of its student enrolments to be enrolled in masters and doctoral programmes. In Chapter 3, Bunting et al. argue that for any African university in the HERANA context that is aspiring to be research-intensive, these target proportions of total head count enrolment should be set as at least 15% for masters students and at least 5% for doctoral students. The 15/5% proportions of masters and doctoral enrolments also sets an important efficiency indicator for an aspiring research-intensive university. Its ratio of masters-to-doctoral enrolments should be no more than 3:1. If the ratio is higher than this, it may indicate that the university is using masters programmes for purposes of professional skills training, rather than for the training of future high-level researchers. The data available show that the ratios of the flagship universities covered a wide range, as can be seen in the examples from 2011 in Table 12.1.

Table 12.1 HERANA data on masters and doctoral enrolments (2011)

University	Masters enrolments as % of total enrolments	Doctoral enrolments as % of total enrolments	Ratio of masters-to-doctoral enrolments
Target	*15%*	*5%*	*3*
Cape Town	16%	5%	3
Makerere	5%	2%	3
Ghana	11%	1%	13
Nairobi	19%	0.5%	47

Compiled by Ian Bunting

A separate academic staffing plan that deals with the staffing resources required for the successful implementation of the enrolment plan is an essential component of the academic structure of a university. A university's academic staffing plan must have close links to the student enrolment plan, particularly in the case of universities that take the production of high-level knowledge to be central to their institutional missions. Bunting et al. (2014) have demonstrated that there is a close link between doctoral and other research outputs and the qualifications and academic rankings of staff. The conclusion reached in the report is that universities that wish, as part of their research-intensive aspirations, to enrol increasingly large numbers of doctoral students, must ensure that they have in place adequate numbers of qualified and senior staff who are able both to supervise doctoral students and to lead research groups. The staff rank and qualification targets set out in Chapter 3 take account of this need for qualified supervisors and senior research leaders, by requiring of an aspiring research-intensive university that at least 50% of the full-time academic staff of a university should hold a doctoral degree, and that at least 60% should be in the senior ranks of full professor, associate professor and senior lecturer. Lecturers, junior lecturers and assistant lecturers are considered to be junior staff members for this purpose.

The HERANA data available indicate that most of the eight flagship universities do not have academic staffing plans in place and, in particular, have not attempted to relate academic staff qualifications and ranks to their high-level knowledge plans. Table 12.2 gives examples, for 2011, of the proportions of academic staff with doctorates and proportions of senior academics.

Table 12.2 HERANA data on full-time academic staff (2011)

University	% of full-time academics with doctorates	% of full-time staff in ranks of professor + associate professor + senior lecturer
Target	*50%*	*60%*
Cape Town	63%	69%
Botswana	65%	44%
Ghana	50%	42%
Nairobi	46%	45%
Mauritius	45%	42%
Dar es Salaam	31%	45%
Makerere	31%	29%
Eduardo Mondlane	18%	17%

Compiled by Ian Bunting

Capacity development

In Chapter 5, Cloete et al. asserted that lack of funding and lack of capacity are overused and over-simplified explanations for the challenges and failures in African higher education.

However, this does not mean that there is no need for capacity development at both national and institutional levels.

At the national governance level, visits to the higher education divisions within the ministries responsible for higher education in the eight HERANA countries were often a disconcerting experience; in most of the offices there were at least some well-educated bureaucrats with PhD degrees and some university teaching experience, surrounded by metre-high piles of administrative folders. By contrast, (at least some of) the national higher education commissions/councils seemed better resourced with more professional and business-like offices. The research group also observed that bureaucrats seldom interact with bureaucrats in similar positions in other countries, and that they are generally excluded from the capacity-building higher education conference circuit. With regard to strengthening higher education divisions in education ministries, there is also a debate about whether higher education should have a dedicated ministry of its own, rather than being embedded within a broader education ministry, or whether higher education should be combined with other key knowledge areas (such as science and technology) in a so-called 'super-ministry'. While there are pros and cons related to each of these options and certainly no 'ideal model',[10] this is a policy issue that should be kept on the table.

The creation of government agencies opens up the space for developing and concentrating specialised higher education capacity and expertise at the national governance level. The higher education councils/commissions in the HERANA study (see Chapter 9) had developed, or were in the process of developing, specialised expertise – both internally within their organisations and externally within institutions and the sector at large – around key higher education functions (e.g. quality assurance, planning, research, policy advice and stakeholder engagement). Arguably, this was bringing capacity into the system that was not available in the parent ministries or their departments. However, the most commonly cited obstacle to function implementation in all eight councils/commissions was the lack of capacity. On the one hand, this manifested as shortages of staff within the organisation in general because vacancies had not been filled. On the other hand, the capacity issue was described in terms of expertise – both within the councils/commissions and within the broader sector – in specialised areas such as quality assurance, research and data analysis.

Comprehensive and up-to-date data on higher education institutions and sectors is a key resource in the effective implementation of a range of governance functions including, for example, decision-making with regard to the accreditation of institutions or the allocation of funds; policy advice to government; and strategic planning for both institutions and the sector. While four of the eight HERANA countries had a tertiary or higher education management information system in place, only in Mauritius and South Africa could these be considered comprehensive. In South Africa, the information system was housed in the national Department of Higher Education and Training, while in Mauritius it was located

10 For an overview of experiences with the super-ministry approach in Europe, see Braun (2008a, 2008b) and Koch (2008).

in the Tertiary Education Commission. The location of the information system is a key issue that governments must decide on.

Capacity issues also emerged in the study on science granting councils in sub-Saharan Africa (Chapter 8). In this regard, Mouton et al. pointed to the need to create opportunities for the councils to share information and learning on a regular basis, and for the capacity-building for the programme officers and staff of these councils to be addressed in a systematic way. The authors also highlighted the possibility of accredited training courses and workshops for continuous professional development in areas such as peer review and evaluation procedures; grant-making procedures; management of international science and technology agreements; policy analysis and research and innovation priority-setting for science, technology and innovation; and the basics of R&D management and bibliometrics.

Regarding capacity at the institutional level, the HERANA project focused on institutional capacity to collect, analyse and develop indicators for strategic planning and strengthening the academic core. In Chapter 2, and in Bunting (2014b), there are more detailed descriptions of the limited institutional data capacity encountered during the first 2009 data collection exercise in the HERANA Phase 1 project. In brief, some universities could not extract the required data because they did not have appropriate or functional electronic student and staff databases, or because there were gaps in the electronic databases or inaccurate classifications and incomplete graduate sets. Furthermore, some institutions did not have a central management information office in which complete data sets were stored. Another major problem was the inability to translate data into indicators, and the absence of comparable performance data with peer institutions. At the launch of HERANA Phase 3 in November 2014, we reported that the capacity of the participating universities had improved dramatically and, as was illustrated in Chapters 2 and 3, there are now comparable performance data for eight flagship universities. Two key units that need to be strengthened in research-intensive universities are institutional data/planning offices and research management/support offices.

To strengthen the academic core, the earlier section on academic structures illustrated the importance of well-qualified and senior staff. Indeed, a study on the entire South African academic staff showed a correlation of over 0.80 between having a PhD and accredited publications on the Web of Science (Pietersen & Sheppard 2012). Increasing the proportion of staff with PhDs, which in most universities in the HERANA sample is below 50%, is thus critical in the move towards research-intensive institutions. Increasing the proportion of academic staff with PhD degrees requires greater attention to and planning at the masters and doctorate levels, as well as human resource strategies that can incentivise staff to pursue doctoral degrees and to retain staff once they are qualified. It should be noted that staff data has been even more problematic than student data, and that at some of the HERANA institutions there is still uncertainty about the actual number of full-time/part-time staff and the exact number of permanent staff with PhDs. Thus, another administrative division that needs to be strengthened in research-intensive institutions is human resource development.

Funding and development aid for research universities or knowledge production

The institutional realities of the senior academic staff at African universities, when it comes to their research tasks, are challenging. It can be argued that the salaries,[11] poor incentive structures, inadequate infrastructure, and the lack of a professional research management system at institutional and national levels are, to a large extent, the result of a lack of consistent and adequate funding earmarked for research. However, this is not the result of a lack of research funding per se. Rather, the nature and source of research income are of relevance here.

A large part of the research income of the HERANA universities comes from donor agencies, which implies that the institutional leadership has limited-to-no direct influence on how this money is invested in the institution's research activities. This further implies that, in practice, the research income situation at the HERANA universities (with the exception of UCT) is one of the main factors contributing to the weak coupling between institutional research strategies and the research activities of individual academics. Nonetheless, the universities themselves can do more to stimulate the development of a stronger institutional research culture, and to incentivise the involvement of their tenured academic staff with doctoral degrees to become involved in academic research activities. As highlighted in Chapter 7, existing research incentive regimes are characterised by many players driving different goals, an over-reliance on donor funding, the de-institutionalisation of science, and inadequate participation of the state. Thus, each institution could introduce incentives schemes and promotion procedures aimed at rewarding academic staff who are active researchers. Such schemes and procedures should be based on research productivity data, such as number and quality of academic publications, number and nature of externally funded research projects, involvement in supervision of doctoral and master students, and so on. From a national policy perspective, there is a need for stronger participation by the state in resourcing basic research infrastructure, and in designing competitive national research funding schemes to steer research in line with national imperatives and support its institutionalisation in higher education institutions.

The data produced by the HERANA project offer an important insight into the specific nature of research income at the eight flagship universities (see Cloete et al. 2011). For example, there is an important gap between the total amount of research income at the universities and their research productivity: as reported in Chapter 6, Makerere University has more or less the same level of research income as UCT, while the research productivity at Makerere is at a much lower level than at UCT. One important reason for this is the difference in the sources of research funding for the institutions. The proportion of the research income coming from foreign (either national or supranational) donor agencies of the non-South African universities in the HERANA project is in general over 75%, which represents a proportion that is many times higher than the figures for UCT. The latter institution's research income situation is more in line with that at the world's top research universities; that is, a considerable part of the

11 It is often claimed that African academics are underpaid but, as Chapter 7 has shown, this is not entirely the case.

research income of UCT is the result of its academic staff being successful in the competition for external research council funding.

As discussed in Chapter 6, the investments of donor agencies in research projects at African universities have a number of characteristics that contribute to the low research productivity of these universities (see also Maassen 2012):

- Donor research funding is not distributed through an open competition, relying on peer review to select the best projects academically.
- Donor agencies in general do not require the academics who are funded by them to produce academic publications.
- Most donor-funded research projects resemble a consultancy activity more than an academic research project.
- There is hardly any coordination between donor agencies when it comes to the investments in research projects in sub-Saharan African universities. Overall the individual donor agency's programmes and ideologies seem to be a more important factor in the determination of which research project should receive donor funding, than national and/or institutional research policies and strategies in the receiving countries and institutions.
- Donor agencies prefer in general to have direct contact with the academics who receive donor research funding. A consequence of this is the 'projectisation' nature of donor research funding, in the sense that donor agencies invest in projects, not in institutions, despite all the recent donor programme emphasis on 'capacity building'. As a consequence it is extremely difficult for African universities to realise their institutional research strategies, when up to 80% of the institutional research income comes from donors who prefer to invest on the basis of their own programmes and ideologies in individual projects.

Donors have played an important role in the funding of African higher education in the post-independence era. Many individual academic staff members have profited from donor funding, which allowed them to supplement their low university income. But even though the amounts of funding invested by donors in (research) projects has been considerable (Maassen et al. 2007), the question can be raised as to whether donor funds are invested in an effective way in African higher education: that is, in a way that, amongst others, stimulates the development of a number of research-intensive universities. For now, the answer to this question has to be in the negative. For this to change, the minimum requirement would be a willingness by donor agencies to coordinate their programmes and investments with one another. An additional element in the stimulation of an adequate research culture in African universities is the need to introduce a more effective and open way of distributing the donors' research funds. This implies more competitive, peer-review-based procedures for selecting research projects for funding. But in this, peer review should be academically-orientated and not, as is currently the case in a number of research-orientated donor programmes, ideology-based.

Finally, as was pointed out in an extensive study of bilateral country investments and foundation partnerships to support higher education in Africa, Maassen and Cloete (2010: 268) concluded that 'none of the donor countries involved subscribes to the engine of development approach in their development cooperation policies with respect to higher education'. The donor countries, which themselves have higher education systems with strong research universities, will have to more actively support the development of research-intensive universities in Africa.

Research funding and expectations of engaging with external communities

As indicated above, university research in African universities is often made possible by funding from foreign donor agencies. While such funding is primarily geared towards building the research capacity of African higher education institutions and to building a relevant local knowledge base to drive innovation and social development, it would be short-sighted if such funding inadvertently weakened the institutions it purported to capacitate. Chapter 10 points to how an empirically informed understanding of university engagement activities could well be of benefit to donors as a means of assessing whether grantee-universities are successfully managing the tension between engaging with external communities and connecting to the academic core. Such assessments could prove influential in the formulation of future funding policies.

In South Africa, there are repeated calls from organisations such as the South African Higher Education Community Engagement Forum for government to provide direct funding for university engagement activities. Government's position is outlined in the *2013 White Paper* as follows: 'it is likely that future funding of such [engagement] initiatives in universities will be restricted to programmes linked directly to the academic programme of universities, and form part of the teaching and research function of these institutions' (DHET 2013). And, universities would need to provide evidence that these conditions are being met.

If any government funds engagement activities per se, it runs the risk of funding non-productive engagement activities, that is, engagement activities such as consultancies or service-orientated work that are poorly articulated and do not strengthen the core functions of the university. Funding should be made contingent on engagement activities linking back to the core knowledge-producing functions of the university, and also demonstrating a strong degree of articulation. From this perspective, university-community engagement funding should not be a separate line item; it should rather be a dimension of normal research (or teaching) funding, conceivably as 'top-up' funding for engagement activities that are able to show a high level of connectivity to knowledge production.

Research-informed reforms

Derek Bok, in his latest book *Higher Education in America,* discusses two different 'cultures' of higher education reforms: the one is evidence-based; the other is an 'art' that requires experience and intuition (Bok 2013). In higher education reform in Africa, leadership

'intuition' is often code for a mixture of nostalgia and random ideas from the latest trip to the United States or Europe. Evidence-based policy and management is a discourse or set of methods based on empirical information that informs the policy process, rather than aiming directly to affect the eventual goals of the policy. Policy based on systematic evidence is considered not only to produce better outcomes, but also to provide more opportunity for democratic participation.

In the HERANA project, we prefer the concept 'research-informed' change for various reasons. While evidence or data are the building blocks, evidence does not provide policy information by itself: often it is possible to read different policy implications from the same data. Research implies that there is some information on causality that informs the evidence. Furthermore, the concept of 'research', which fits better with the language of universities, addresses the issue that Bok raises about being 'top down'. Finally, research is more open-ended, and more open to verification/falsification – meaning experimental rather than instrumentally driven.

Through the HERANA project, it has become apparent that the management of information is an indicator of the degree of institutional coherence or fragmentation. While in some cases, fragmentation is the result of a shortage of trained staff or inappropriate technology, in others, a major problem appears to be the lack of institutionalisation of data and procedures. Because institutionalisation is the basis for evidence-based policy and management, it is very problematic when 'once-off' data sets are used to influence decision-making. Moreover, a limited capacity for analysing data and translating it into policy information has various consequences. For example, lack of indicator data often leads to a mismatch between aspiration and reality, where institutional leaders and websites declare their universities to be 'research-led' or even 'world-class' while, in some of these universities, on average academics publish one article every ten years, and the output is stagnant or declining. This is a central weakness in African higher education.

Consistency in the understanding of key concepts is another potential contributor to fragmentation. HERANA Phase 2 has already shown the value of institutionalising a shared understanding of key concepts related to the collection of performance data at eight African universities. In a South African study, Kruss et al. (2012) found that while all the universities in their sample had a formally approved policy framework on engagement in place, conceptual clarity and a unified vision of how engagement should be integrated into the university's activities eluded the universities. This fuelled contestation, and hampered alignment and integration of engagement policies with other institutional policies pertaining to research, and teaching and learning. An empirical approach (as outlined in Chapter 10) has the potential to shift the debate on how to integrate a contested university function such as engagement from one that is dogged by immutable ideological positions to one that is research-informed. Such a shift in which institutional policy is empirically supported and the activities of academics are quantified in accordance with integrated policies may, in turn, systematise the engagement activities of academics. In so doing, this would reinforce

the institutionalisation of engagement in universities in a manner that strengthens the core functions of the university, particularly that of knowledge production.

In South Africa, with its higher education management information system (to which institutions have to respond in great detail in order to get government subsidy), there is often an 'avalanche' of data, which is not available in accessible format for institutional planning and performance comparison (Van Schalkwyk et al. 2013). At most of the HERANA universities, government mainly requires undergraduate enrolment and graduation data, and perhaps performance in comparison to the previous year. What is missing is national and international comparative performance information and a focus on data related to particular reform or institution-strengthening strategies. What is also missing in many African countries is an incentive to provide data to the central administration, and for the administration to report to government and the higher education councils. In South Africa this problem has been very well addressed: universities simply do not get their annual funding if they have not supplied the required data, and institutions and academics do not get their research incentive funds if they have not supplied research output data.

In November 2013, the participating HERANA universities were asked to write a short report on the usage of the data and indicators in their institutions and systems. The following are some of the important observations made in these reports:

- Data is used internally for monitoring and evaluating the institutional strategy;
- Research performance indicators are crucial for establishing the interface between research impact and appropriate research policy;
- Calibrating research performance by academic rank is currently a vital research management information activity;
- The indicators have been a crucial source of cross-national and cross-institutional comparative data, which enabled the university to mirror itself and develop a set of new goals for the future;
- Indicator reports have been used as a platform to get feedback from both internal and external stakeholders about university core activities;
- The university indicators have already in some countries started to inform national discussions on the performance of public universities;
- The university has used the data to initiate action to engage government more actively to determine and execute relevant research aimed at engendering economic development; and
- The comparative indicator data has been important for beginning to inculcate evidence-based decision-making within the institution.

The HERANA focus on institutionalising data collection and the development of comparative indicators has taken place at a time when the continent is witnessing an increased emphasis on university ranking systems at the global level, from which African universities have been

largely excluded. In this regard, the project has increased awareness of the importance of comparative performance indicators amongst a comparable set of African universities, and has promoted a debate about the need for research-intensive or new knowledge-producing universities in Africa.

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