Chapter 6

Roles of universities and the African context

Nico Cloete & Peter Maassen

While the first of CHET's 'Castells books', *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 and third books, *Universities and Economic Development in Africa* (Cloete et al. 2011) and *Knowledge Production and Contradictory Functions in African Higher Education* (Cloete et al. 2015), concerned themselves more directly with the developmental roles of the university in Africa in relation to the knowledge economy.

In his lecture at the University of the Western Cape in 2009 (see Chapter 4), Castells provided a typically encompassing, but interlinked view of higher education in society (Chapter 4: 57):

> If we take seriously the notion that we live in a global knowledge economy and in a society based on processing information – as universities primarily are – then the quality, effectiveness and relevance of the university system will be directly related to the ability of people, society and institutions to develop. In the context of a technological revolution and 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. Universities also become the

> critical source of the equalisation of chances and democratisation of society by making possible equal opportunities for people. This is not only a contribution to economic growth, it is a contribution to social equality or, at least, lesser inequality.

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).

Drawing on Kerr and Castells, the four key roles of higher education can 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 (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 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-oriented 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 the contrary (Cross et al. 1999).

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). Values and elite selection became closely connected through 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 which 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. In addition, Scott (1995: 1) added that a characteristic of massified systems is that they are 'endlessly open, radically reflexive with considerable ambiguity and radical discontinuities'. Castells has warned against the dangers attending the strategy of 'endlessly open', as we have seen above.

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, ideally at least, an academic elite, independent of (or at least much less dependent on) class or background. John Shaplin, 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 (Shaplin 2014). 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' (Shaplin 2014). Massification is thus a mixed blessing, as Castells has warned.

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 being the reproduction or transmission of 'accepted' knowledge to 'learning to learn' or to become '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 (Castells 2001).

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 then US and UK universities combined (Watson 2010). 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

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

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), as well as the stated intention to provide greater access to higher education throughout the US (Douglass 2007).

As emphasised by Kerr, and indeed by Castells, a challenge for universities is that they cannot specialise in only one function; in fact, 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 contradictory functions. For example, ideological apparatuses are not purely reproductive machines, as Pierre Bourdieu sometimes implied.[2] 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 rather 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).

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

and the University of California, Berkeley, started as Land Grant universities.

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

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 which are solid and dynamic enough to withstand the tensions triggered by the simultaneous performance of contradictory functions. As Castells (Chapter 3: 42–43) 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 (see Castells, Chapter 4 above). 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 to enhance research opportunities 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.'

Both the British government, following the Asquith Commission (1945), and the French, following the Brazzaville meeting (1944), saw the university 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), 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 (Mamdani 2008).

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, averaging between 5–10%. In the HERANA group of countries specifically (see Chapter 7 below), only Mauritius and Botswana had a participation rate above 20% by 2012 (World Economic

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

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 simply overcrowded elite systems (i.e. they massified without resources).

However, when it came to the ideological apparatus function, things unravelled very quickly owing to the instability of the conflicting and competing political elites – 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 scientific tasks 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).

This 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[4] 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 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 for 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

4 At the time of independence, the higher education systems in most African countries were mostly limited to a single national university. It is thus not possible to speak of a higher education system as such at that time.

their counterparts in the rest of the world, and mainly at the lower degree or diploma level. Much of the growth in student numbers has taken place in traditional fields such as law, humanities and social sciences, rather than in science, engineering and technology (Bunting et al. 2014; Kapur & Crowley 2008). The scientific function has received far less attention.

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' (Yesufu 1973). 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.[5]

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 more 'globally-oriented' African academics. This was at least partly because this 'development discourse' was more along the lines of the land-grant model rather than that of the research-orientated model. It was also partly because 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

5 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).

agreement between universities and 'liberation' governments[6] 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 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 evident in the dramatic decreases in per capita spending on higher education in Africa: '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 is a staggering decrease of 82%. 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 argue that universities should be trimmed

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

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).

In his 2000 lecture (see Chapter 3 above), 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, amongst others, to 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 overseas universities, 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), as well as managing the tension between the social friction – rapid expansion – and the scientific function of research.

However, there was a revitalisation of higher education in

the post-2000 period and a number of the accepted reasons for poor performance did not hold anymore. 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 countries (Brazil, Russia, India, China and South Africa). In general, however, sub-Saharan universities still appear to be lagging behind. In their book, Altbach and Balán (2007) 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' (Altbach and Balán 2007: vii). Strikingly, the authors did not provide any arguments or data for their claims.

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 would 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 (CODESRIA), 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 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 International Monetary Fund (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 (Mamdani 2008: 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 (2009) 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 IMF responded critically to the debt-relief 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.[7] 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 Millennium Goals and the UK Prime Minister's enthusiasm during the G8, finally abandoned their rather slavish

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

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.*[8] 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 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 (MacGregor 2009). 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, was without a director.

Concurrent to the revitalisation discourse, other voices arose to support higher education in Africa. The World Bank itself, influenced by Castells's (1991) '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'.

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

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).

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 and indeed has been so since the 1960s. 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'

which 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 post-colonial 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 had 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' (MacGregor 2010). 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's 'engine of development' notion which, as highlighted earlier, has much more recently 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 NEPAD, 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?

While Castells's 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? What is required is research that does not take these factors as a given, but instead conducts detailed empirical analyses of the dynamics of a number of African flagship universities and their socio-economic and political contexts, while acknowledging Castells's thesis on the contradictory functions in contemporary universities.

Chapter 7

Universities and economic development in Africa

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During the post-independence period, every African country has struggled with the problematic of the role of higher education in development. Until the mid-1990s, the role of higher education in development programmes and policies in Africa was somewhat of an anomaly, with most education development projects focusing on primary school education. International donors and partners regarded universities, for the most part, as institutional enclaves without deep penetration into the development needs of African communities. As such, higher education was seen as a non-focal sector and even as a 'luxury ancillary', a view that was for many years promoted by the World Bank (Brock-Utne 2002; Hayward 2008; Maassen et al. 2007; Mamdani 2008; Psacharopoulos et al. 1986; Sawyerr 2004).

Dramatic declines in expenditure on higher education were associated with these policies: spending per student fell from USD 6 800 in 1980, to USD 1 200 in 2002, and later to just USD 981 in 33 low-income sub-Saharan African countries. Lack of investment in higher education delinked universities from development, led to development policies that had negative consequences for African nations, and caused the decline, and in some cases closure, of institutions and areas of higher education that are critical to development (Hayward 2008).

During the 1990s and early 2000s some influential voices (including the World Bank 1999, 2007, 2009) started calling for the revitalisation of African universities and for linking higher education to development. At a World Bank seminar in Kuala Lumpur in 1991, Manuel Castells argued that in an information or knowledge economy, the knowledge institution (university) will be 'the engine of development' (Castells 1991: see Chapter 3 above). This paper had, according to Jamil Salmi, contributed substantially to the recognition at the World Bank about the importance of knowledge, as their subsequent series of publications show: *Knowledge for Development* (1999); *Constructing Knowledge Societies: New challenges for tertiary education* (Salmi 2002); *The Knowledge Economy* (2007) and *Accelerating Catch-up: Tertiary education for growth in Sub-Saharan Africa* (2009).

Research during the last decade has suggested a strong association between higher education participation rates and levels of development, and considerable theoretical and empirical evidence has emerged about the importance of the university in producing high levels of what Castellls calls 'self-programmable' skilled workers, and research and innovation (Carnoy et al. 1993; Castells 2001). However, this notion has also become something of an ideology: the European Commission and the OECD in particular, often beat this drum without empirical evidence and it is the current dominant discourse (Douglass et al. 2009).

Many rapidly developing nations such as Korea, China and India put knowledge and innovation policies, and higher education, at the core of their development strategies, based on the assumption that the ability to absorb, use and modify technology developed mainly in high-income countries will drive more rapid transition to higher levels of development and standards of living (Pillay 2010).

For Africa, the change in direction was clearly signalled when Kofi Annan, then Secretary-General of the United Nations, promoted the importance of universities for development in Africa, stating that: 'The university must become a primary tool for Africa's development in the new century' (quoted in Bloom et

al. 2006: 2). This position was endorsed ahead of the UNESCO World Conference on Higher Education in 2009 when a group of African education ministers called for improved financing of universities and a support fund to strengthen training and research in key areas (MacGregor 2009).

The Higher Education Research and Advocacy Network in Africa (HERANA)

The Higher Education Research and Advocacy Network in Africa (HERANA) was established in 2008 with funding support from the US Foundation Partnership (Ford Foundation, Carnegie Corporation of New York, Rockefeller Foundation and Kresge Foundation) and from the Norwegian Agency for Research and Development (NORAD). It was managed by the Centre for Higher Education Trust (CHET) in South Africa.

The HERANA network consisted of eight African universities – the University of Botswana, University of Cape Town, University of Dar es Salaam, Eduardo Mondlane University, University of Ghana, University of Mauritius, Makerere University and the University of Nairobi – and more than 50 participating academics from Africa, Europe and the US.[1] The universities included in the study were selected primarily on the basis of previous collaboration, and because each was regarded as a national or flagship university.

At its inception, the broad aim of the project was to investigate the complex relationships between higher education and economic development in selected African countries with a focus on the contexts in which universities operate, the internal structure and dynamics of the universities, and the interaction between the national and institutional contexts. It

1 Nelson Mandela Metropolitan University (NMMU) participated in the first two phases of HERANA and was included because of its comparability in terms of its size and profile to the other African universities. The University of Cape Town was added to the HERANA network at the request of other African universities who wanted to be compared to the flagship university in South Africa (UCT is the highest ranked university in South Africa). NMMU did not participate in the third phase of the HERANA project.

also aimed to identify factors and conditions that facilitate or inhibit universities' ability to make a sustainable contribution to economic development.

The first phase of the HERANA project began with a review of the international literature on the relationship between higher education and economic development This was followed by case studies of three systems that have effectively linked their economic development and higher education policy and planning – Finland, South Korea and North Carolina State in the US (Pillay 2010).

In the second half of phase 1 of the HERANA project, data were collected at both the national and institutional levels in the eight African countries and HERANA universities.

In Phase 2 and 3 HERANA continued its focus on knowledge production, albeit at an institutional level only. Activities in Phases 2 and 3 included the collection of data on the academic core and the institutionalisation of data collection and analysis at the eight participating African universities in order to guide research-informed policy-making in support of creating research-intensive universities.

This chapter provides the findings and insights from Phase 1 of the HERANA project and shows how Castells's model of the four university functions and, in particular, the university function of knowledge production for development, shaped the early work of the HERANA project.

Notions of the role of the African university in development

At a more systemic level, the HERANA project sought to establish how national and institutional stakeholders conceptualise the role of higher education and of the university in development. HERANA was keen to establish whether there was consensus or disjuncture between the national level and the universities included in the project. HERANA's analytical framework for addressing these interests comprised four notions of the relationship between higher education (especially universities) and national development; notions that draw loosely on Castells's proposition that there are

four historically determined and contradictory university functions. In particular, the notions of the university as ancillary and of the university as a critical producer of new knowledge that fuels its function as an engine of development, derive from Castells's thinking on the functions of universities, and his conceptualisation of self-programmable labour, innovation and the knowledge economy. The four notions are:

- *The university as ancillary*: When the starting-point for development is predominantly ideological, it is assumed that there is no need for a strong (scientific) knowledge basis for development strategies and policies. Neither is it necessary for the university to play a direct role in development since the emphasis is on investments in basic healthcare, agricultural production and primary education. The role of universities is to produce educated civil servants and professionals (with teaching based on transmitting established knowledge rather than on research), as well as different forms of community service.
- *The university as self-governing institution*: The knowledge produced by the university is considered important for national development – especially for the improvement of healthcare and the strengthening of agricultural production. However, this notion assumes that the most relevant knowledge is produced when academics from the North and the South cooperate in externally funded projects, rather than being steered by the state. This notion portrays the university as playing an important role in developing the national identity, and in producing high-level bureaucrats and scientific knowledge – but not directly related to national development; the university is committed to serving society as a whole rather than specific stakeholders. This notion assumes that the university is most effective when it is left to itself, and can follow institutional priorities, independent of the particularities of a context. It also assumes there is no need to invest additional public funds to increase the relevance of the university.
- *The university as instrument for development agendas*: In this

notion, the university has an important role to play in national development – not through the production of new scientific knowledge, but through expertise exchange and capacity building. The focus of the university's development efforts should be on contributing to reducing poverty and disease, to improving agricultural production, and to supporting small business development – primarily through consultancy activities (especially for government agencies and development aid) and through direct involvement in local communities.

- *The university as engine of development*: This notion assumes that knowledge plays a central role in national development – in relation to improving healthcare and agricultural production, but also in relation to innovations in the private sector, especially in areas such as information and communication technology, biotechnology and engineering. Within this notion, the university is seen as (one of) the core institutions in the national development model. The underlying assumption is that the university is the only institution in society that can provide an adequate foundation for the complexities of the emerging knowledge economy when it comes to producing the relevant skills and competencies of employees in all major sectors, as well as to the production of use-oriented knowledge.

These four notions are situated in the interaction between the following scenarios: (1) Whether or not a role is foreseen for new knowledge in the national development strategy; and (2) Whether or not universities, as knowledge institutions, have a role in the national development strategy.

Drawing on data gathered via interviews with national and university stakeholders, several insights emerged with regard to the envisaged or projected role of the university as knowledge producer in development.

At the national level, three main observations are made based on the data collected. Firstly, the instrumental notion was the strongest, followed by engine of development and self-governing. Secondly, the engine of development notion was to be found

mainly in science and technology policies and in national vision statements, but seldom in ministries of education – with the exceptions of Botswana and Mauritius. The references to the knowledge economy, and its importance in vision statements, seem to draw considerably from 'policy-borrowing', particularly from World Bank and OECD sources and websites. Thirdly, in the case of the instrumental notion, most national government officials felt that universities were not doing enough, but there were no policies that spelt out, or incentivised, this instrumental role.

Regarding the institutionally located notions, the following observations could be made. Firstly, self-governance and the instrumental roles were strongest, which reflect the traditional debates about autonomy and community engagement, respectively. Secondly, only within the universities of Ghana and Dar es Salaam was there still a traditional notion of the university producing human capital for the nation, and of the university 'knowing best what is required'. Interestingly, the leadership of neither of these two institutions expressed a knowledge economy discourse. Thirdly, Mauritius was the only institution with the engine of development as the dominant discourse, and it corresponded with the view of government. At Makerere there was considerable agreement between government and the university, except that there was an increasing awareness at the university about the knowledge economy and the engine of development notion. Finally, at NMMU, which is an institution where a former 'traditional' university was merged with a technikon (polytechnic), all four notions were present and in contestation.

In terms of notions of the role of the university in development, at both national and institutional levels, the most obvious unresolved tension was between the self-governance and instrumental roles. This reflects the well-known tension between institutional autonomy, on the one hand, and engagement or responsiveness, on the other.

At the national level in most of the countries, the dominant expectation for higher education was an instrumental one, with a constant refrain that the university was not doing enough to

contribute to development – but often referring to social problems, and not economic growth. The engine of development notion was stronger amongst government stakeholders than within the universities, but it could be that government saw knowledge as a narrow instrumental, rather than an engine of development notion. It is nevertheless surprising that amongst university leadership the support for a knowledge economy approach was weak.

The academic core of eight African universities

The university's unique contribution to development is via knowledge – transmitting knowledge to individuals who will go out into the labour market and contribute to society in a variety of ways (teaching), and producing and disseminating knowledge that can lead to innovation or be applied to the problems of society and economy (research, engagement). Part of what impacts on a university's ability to make a sustainable contribution to development therefore focuses on the nature and strength of its knowledge activities, or in Castells's terms, its education and scientific functions.

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', this study used the concept 'academic core' – it is this core that needs to be strong and relevant if flagship universities – such as those included in this study – as key knowledge institutions, are to contribute to development.

While most universities also engage in knowledge activities in the area of community service or outreach,[2] a key assumption is

2 See Chapter 9 of this volume for a more detailed account of the HERANA project's empirical work on university–community engagement, including outreach and

that the backbone or the foundation of the university's business is its academic core – that is, the basic handling of knowledge through teaching via academic degree programmes, research output, and the production of doctorates (those who, in the future, will be responsible for carrying out the core knowledge activities).

The eight participating HERANA universities are the leading knowledge-producing institutions expected to contribute to research and development in their respective countries. This is well expressed in the University of Botswana research strategy (2008: 3):

> The university has the largest concentration of research-qualified staff and research facilities in the country and has an obligation to develop the full potential of these resources. By doing so, it can play a central part in the multiple strategies for promoting research, development and innovation that are now on the national agenda.

A review of the vision and mission statements of the eight universities reveals a number of common aims relating to both the nature and strength of their academic cores, as well as their contribution to development. These aims can be summarised as follows:

- To have high academic ratings, making them leading or premier universities – not only in their respective countries but also in Africa;
- To be centres of academic excellence which are engaged in high-quality research and scholarship; and
- To contribute to sustainable national and regional social and economic development.

The question HERANA poses is: Does the evidence support these ambitious aims for academic excellence? In other words, is there evidence that these universities have strong academic cores or, at the very least, are moving in that direction?

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community service, on the academic core of the university.

Data on the academic core in African flagship universities

CHET started to compile data on a group of African universities in 2007 as part of a project titled 'Cross-National Higher Education Performance (Efficiency) Indicators'.[3] The data collected was discussed at a workshop in March 2009 where it emerged that although a basic data set had been compiled from institutional representatives and planners, most of the universities had experienced difficulties in completing the 2007 data templates. The first finding about the academic core was clear: there is a need to improve and strengthen the definition of key performance indicators, as well as the systematic, institution-wide capturing and processing (institutionalisation) of key data.

To evaluate empirically the strength of the academic core of the HERANA universities, eight indicators were identified, all of which refer to characteristics or activities that reflect the production of high-quality scholarship which, in turn, forms the basis of each university's potential contribution to development. The eight indicators, and the rationale for their inclusion, are outlined below. They are divided into five input and three output indicators. Some of these indicators are based on traditional notions of the role of flagship universities (e.g. the production of new knowledge and the next generation of academics) while others (e.g. science, engineering and technology enrolments and student–staff ratios) are pertinent to the African context.

The five input indicators are as follows:

1. *Increased enrolments in science, engineering and technology (SET)*: In African governments and foreign development agencies alike, there is a strong emphasis on SET as important drivers of development (Juma & Yee-Cheong 2005). Included in SET are

3 See http://www.chet.org.za/programmes/indicators/

the agricultural sciences, architecture and urban and regional planning, computer and information science, health sciences and veterinary sciences, life sciences and physical sciences.
2. *Increased postgraduate enrolments*: The knowledge economy and universities are demanding increasing numbers of people with postgraduate qualifications.
3. *A favourable academic staff to student ratio*: The academic workload should allow for the possibility of research and PhD supervision.
4. *A high proportion of academic staff with doctoral degrees*: Research (CHET 2010) shows that there is a high correlation between staff with doctorates, on the one hand, and research output and the training of PhD students, on the other.
5. *Adequate research funding per academic*: Research requires government and institutional funding and 'third-stream' funding from external sources such as industry and foreign donors.

The three output indicators are as follows:

1. *High graduation rates in SET fields*: Not only is it important to increase SET enrolments, it is crucial that universities achieve high graduation rates in order to respond to the skills shortages in the African labour market in these fields.
2. *Increased knowledge production in the form of doctoral graduates*: There is a need for an increase in doctoral graduates for two reasons. Firstly, doctoral graduates form the backbone of academia and are therefore critical for the future reproduction of the academic core. Secondly, there is growing demand for people with doctoral degrees outside of academia (e.g. in research organisations and other organisations such as financial institutions).
3. *Knowledge production in the form of research publications in Web of Science journals*: Academics need to be producing peer-reviewed research publications in order for the university to participate in the global knowledge community and to contribute to new knowledge and innovation.

The strength of, and changes in, the academic core

The data indicate that, apart from NMMU and Ghana, each of the universities had at least one 'strong' rating (see Table 2 in Appendix 1) across the eight indicators. Cape Town was rated 'strong' for all eight indicators, Mauritius for four of the eight, Dar es Salaam and Nairobi for three of the eight, and Botswana, Eduardo and Makerere for two of the eight indicators.

A large number of 'weak' ratings appear in the scores of different universities. Eduardo was rated as 'weak' on six of the eight indicators; Botswana and Ghana on five of the eight indicators. Makerere and Nairobi were rated as 'weak' on four of the eight indicators, and Mauritius on three of the eight indicators. NMMU had two 'weak' ratings and Cape Town none.

On the input side, Cape Town's overall rating was 'strong', and those of Dar es Salaam, Mauritius and Nairobi were about mid-way between 'strong' and 'medium'. Two universities, Makerere and NMMU, had overall input ratings which were close to the average 'medium' rating. Three universities – Botswana, Eduardo and Ghana – had overall input ratings mid-way between 'weak' and 'medium'. On the output side, Cape Town's average rating was 'strong', and no other university had output ratings of above 'medium', except NMMU had a 'medium' rating. The remaining seven universities had overall output ratings below the 'medium' rating.

From these scores the institutions can be broadly categorised into the following groups:

- Group 1: University of Cape Town, the only university which was 'strong' on all input and output ratings.
- Group 2: University of Mauritius, Makerere University and NMMU which had 'medium' or 'strong' ratings on both the input and the output sides.
- Group 3: The universities of Dar es Salaam, Nairobi and Botswana which had overall 'medium' and 'strong' ratings on the input side, but were 'weak' on the output side.

- Group 4: University of Ghana and Eduardo Mondlane which had 'weak' ratings on both the input and the output side.

The data indicate that, with the exception of Cape Town, the other universities do not have academic cores that live up to the high expectations contained in their mission statements. However, the data show considerable variance amongst the institutions in terms of input indicators, and some convergence regarding output indicators, again with the exception of Cape Town.

Two input indicators with considerable variation are student–staff ratios and permanent academics with doctorates. With regard to student–staff ratios, two institutions managed to decrease the instruction loads of their academic staff (Mauritius: ratio of 24:1 in 2001 to 16:1 in 2007; NMMU: 31:1 down to 28:1) (see Table 2 in Appendix 1). The student–staff ratio at Ghana increased substantially from 12:1 in 2001 to 31:1 in 2007, as did that of Botswana from 14:1 in 2001 to 27:1 in 2007. The ratios at other institutions increased, but not dramatically.

These ratios do not support the stereotype of 'mass overcrowding' in African higher education; certainly not at the flagship universities. While one institution (Ghana) had a ratio of over 30:1, six institutions were under 20:1. These gross figures do, however, obscure substantial variations within the fields of study offered by institutions. For example, at Nairobi, the student–staff ratio in 2007 in SET was 8:1 while it was 42:1 in business. More unfavourable examples are Ghana where the 2007 SET ratio was 9:1 and the business ratio was 68:1, and Makerere where the 2007 SET ratio was 11:1 and the business ratio 96:1. More 'normal' variations were observed at Cape Town which, in 2007, had a 22:1 ratio for SET and 42:1 for business, and Dar es Salaam which had 14:1 for SET and 22:1 for business.

A study by CHET (2010) on higher education differentiation showed that in South Africa there is a highly significant correlation of 0.82 between the proportion of the academic staff of a university that has a doctorate as their highest qualification and the research publications produced at that university. This

implies that it is only in exceptional cases that academics without a doctorate publish in internationally recognised peer-reviewed journals or books.

The data show that in 2007 three universities had proportions of permanent academics with doctorates of 50% or higher. They were Nairobi (71%), Cape Town (58%) and Dar es Salaam (50%). This is very strong capacity – in South Africa, only 3 of 23 universities in 2007 had a proportion of 50% or higher of permanent academic staff with doctorates. Ghana, Makerere, Mauritius and NMMU had, in 2007, proportions of permanent academic staff with doctorates in the band 30% to 49%. No trend data are available for this indicator to comment on whether the percentages of staff with doctorates are increasing or decreasing.

The three output indicators are SET graduation rates, doctoral graduates and publications in ISI-recognised journals. For SET graduation rates, an average annual ratio of 25% SET graduates to SET enrolments is roughly equivalent to a cohort graduation rate of 75%, a ratio of 20% is equivalent to a cohort graduation rate of 60%, and a ratio of 15% is equivalent to a cohort graduation rate of 45%. The SET graduation rates show that Botswana, Makerere, Mauritius and Cape Town all have rates of at least 60% of the cohort of students graduating, while Dar es Salaam's is just under 60%. The rest are under 50%. Eduardo Mondlane, which had the highest proportion of enrolments in SET (54% of its enrolments during 2001–2007), had the poorest graduation rate.

Doctoral output is very low. Five of the universities (Botswana, Dar es Salaam, Ghana, Mauritius and Eduardo) produced 20 or fewer doctorates in 2007, while three universities (Makerere, Nairobi and NMMU) produced between 20 and 40, and Cape Town over 100. Most worrisome is that amongst all the institutions, the growth in doctoral graduations is below 10%, with the exceptions of Ghana, Dar es Salaam and Makerere, which grew from a very low base. At the University of Nairobi, doctoral enrolments declined by 17%.

The slow growth in doctoral enrolments is in sharp contrast to the 'explosion' of masters enrolments. At Dar es Salaam,

enrolment of masters increased by 23.5% (from 609 in 2001 to 2 165 in 2007). Three other universities (Mauritius, Makerere and Botswana) had average annual increases of higher than 10% between 2001 and 2007. At the other universities growth was below 10%, with Cape Town growing less than 1%.

As was indicated above, the fast growth in masters enrolments was not matched by a commensurate expansion in doctoral studies. For example, at Nairobi, masters enrolments between 2001 and 2007 grew at an average annual rate of 7.7% while doctoral enrolments declined. At Makerere, masters enrolments grew at an annual rate of 15.5% while doctoral enrolments grew at only 2.3%. The continuation rates from masters to doctoral studies seem absurdly low in certain cases. An ideal ratio of masters to doctoral enrolments should be at least 5:1, which is an indication that masters graduates flow into doctoral research programmes. In 2007, Cape Town, Mauritius and NMMU all had ratios of masters to doctoral students below 4:1. Botswana, Dar es Salaam and Ghana all had ratios between 10:1 to 23:1, while the other three – Eduardo Mondlane, Makerere and Nairobi – had ratios above 50:1.

Regarding research publications, it is assumed that a flagship knowledge producer must produce research-based academic articles that can be published in internationally peer-reviewed journals and/or books. The target for permanent academics was set at one research article in a Web of Science indexed journal to be published every two years, which translates into an annual ratio of 0.50 research publications per academic. In our sample, which deals with average ratios for the period 2001–2007, only Cape Town (with an average of 0.95) met this requirement. With the exceptions of NMMU (0.31) and Mauritius (0.13), the ratios of the other universities imply that on average each of their permanent academics is likely to publish only one research article every ten or more years.

From the above it is evident that particularly the output variables of the universities are not strong enough to make a sustainable knowledge production contribution to development. Nevertheless, there are some positive trends. The majority of

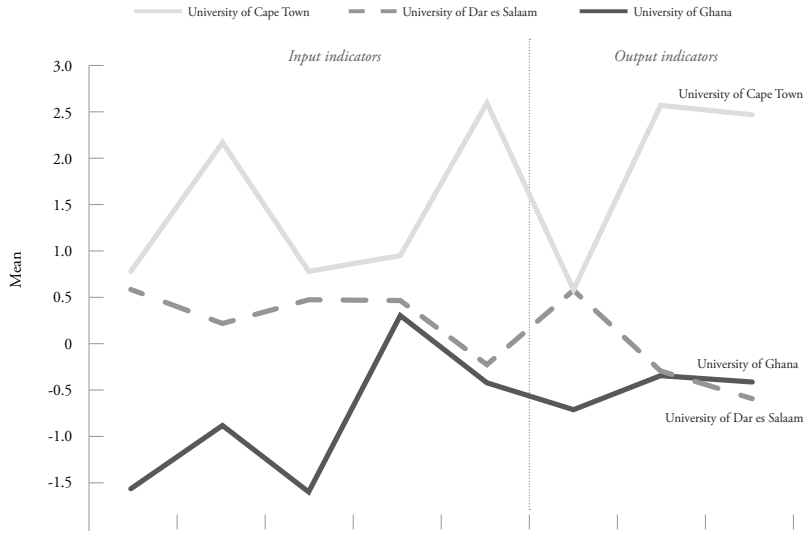
universities have strong input performance in academics with doctorates, student–staff ratios, and an increase in enrolments at the masters level. On the output side, the graduation rate of SET is quite strong for most of the institutions. There is also an increase in research output, albeit from a very low base. However, it should also be noted that even though the research productivity in terms of academic articles produced is increasing at the universities in the study, since the productivity in the rest of the world is increasing much faster, the relative position of Africa as knowledge producer is decreasing gradually. Sub-Saharan Africa contributes around 0.7% to world scientific output, and this figure has decreased over the last 15 to 20 years (French Academy of Sciences 2006).

Capacity and productivity

There is a long-held common-sense view that the lack of research output in African universities is simply a lack of capacity and resources. However, a closer inspection of the input and output indicators raises some interesting questions about this assumption. In order to explore this further, we selected Cape Town from Group 1, Dar es Salaam from Group 3 and Ghana from Group 4 as representatives of these groups and plotted a comparative graph based on standardised scores (see Figure 1).

The data show that there are surprising similarities between Dar es Salaam and Cape Town in terms of input indicators such as SET enrolments (Cape Town 41%, Dar es Salaam 40%), student–staff ratio (Cape Town 13:1, Dar es Salaam 14:1) and academics with PhDs (Cape Town 58%, Dar es Salaam 50%). Ghana, on the other hand, is only similar to the other two in terms of staff qualifications. On the input side, the big difference between Cape Town, on the one hand, and Dar es Salaam and Ghana on the other, is in percentage of postgraduate students (Cape Town 19% versus Dar es Salaam 9% and Ghana 7%) and research income per permanent staff member (Cape Town USD 47 700 versus Dar es Salaam USD 6 400 and Ghana USD 3 400).

Figure 1: Academic core indicators (standardised data) for three selected African universities, 2007



University	% SET majors	% masters + doctorates	Student: staff ratio*	% academics with doctorates	Research income per permanent academic ppp$	SET graduation rate	Doctoral graduates as % of permanent academics	Research publications per academic
Cape Town	41%	19%	13	58%	47 700	21%	15.00%	0.95
Dar es Salaam	40%	9%	14	50%	6 400	19%	2.18%	0.08
Ghana	19%	7%	22	47%	3 400	16%	0.17%	0.11

* In the data table the student:staff ratio is given, whilst the inverse of the student:staff ratio has been used in the graph representing the results of the k-means clustering. This was done because a high student:staff value is unfavourable and should thus reflect a low value in the k-means clustering. The University of Ghana has a high value for student:staff value in the table but the inverse shows a low value in the graph of the means for the clustering.

With regard to output indicators, Cape Town and Dar es Salaam have similar SET graduation rates (21% and 19%, respectively). The dramatic difference is in doctoral graduates (average for 2001–2007): Cape Town 15% of academic staff, and Dar es Salaam and Ghana less than 3% per academic staff member; and publications (2007): Cape Town 1 017, Ghana 61 and Dar es Salaam 70.

These data pose some intriguing issues for higher education in Africa. Cape Town and Dar es Salaam have remarkably similar

profiles in terms of SET (input and output), student–staff ratios, and staff with doctorates, but are not comparable regarding the production of doctorates and publications. What distinguishes Cape Town from the other institutions is much higher proportions of postgraduates, research income and knowledge production outputs.

In terms of input capacity, Cape Town and Dar es Salaam are surprisingly similar, with the exception of research income (resources). Does this mean that research income is the only factor that prevents Dar es Salaam from achieving the same level of outputs as Cape Town?

During interviews with senior academics, three factors emerged that raise questions and warrant further research. The first is the problem of research funding. Not only is there very limited research funding, but the cumbersome application procedures and the restrictions on what the research funds can be used for makes consultancy money much more attractive; in other words, consultancy money directly supplements academics' income, and the researchers also have much more discretion about how it is used. The negative side of consultancy funds is that there is no pressure or expectation to publish, nor to train postgraduate students. It thus affects negatively both aspects of knowledge production, that is, postgraduate training and publishing.

Incentives to publish, as is the case in many countries, are a problem. After obtaining the professorship, publishing in international journals is not directly rewarded, but is rather a matter of prestige or 'institutional culture'. In order to incentivise this activity, universities in Africa might have to start exploring incentive systems. In South Africa, the national government subsidises each institution to the tune of about USD 45 000 per PhD graduate and USD 15 000 per accredited publication. But this is not a simple correlation. Two of the universities with the highest publication rates per permanent academic (Cape Town and Rhodes) do not pass a portion of the subsidy directly to the academic or the department, but put it in a pool which funds common research infrastructure, or where everybody can compete for it.

Another dimension that certainly warrants further exploration is the relationship between research and consultancy. A PhD study by Langa (2010) suggests that having a strong academic network link, with publications, is an entry for getting consultancies. So, it is not that academics choose research or consultancy; some do a balancing act between research and consultancy, while others seem to 'drift off' into consultancy and foreign aid networks.

A second problem that is affecting the production of doctorates, and associated research training and publication, is the huge increase in taught masters courses which do not lead to doctoral study. For example, the University of Cape Town had 2 906 masters enrolments and 1 002 doctoral enrolments in 2007. In contrast, in 2007 Dar es Salaam had 2 165 masters students and only 190 doctoral enrolments (see Table 3 in Appendix 1). This means that there is a serious 'pipeline' problem at universities like Dar es Salaam. This could be because the masters degree does not inspire sufficient confidence in students to enrol for the PhD, or because there are no incentives to do so, or because individuals are pursuing their PhD degrees abroad. Whatever the reason, the effect is a serious curtailing of PhD numbers and hence of an essential ingredient in the knowledge production process.

According to the discussions with interview respondents, the third factor that distracts academics from knowledge production is supplementary teaching. The new method of raising third-stream income – namely, the innovation of private and public students in the same institution, with additional remuneration for teaching the private students – has the result that within the university, academics are teaching more to supplement their incomes. In addition, the proliferation of private higher education institutions, some literally within walking distance of public institutions, means that large numbers of senior academics are 'double' or 'triple teaching'.

PhD supervision, in a context where the candidate in all likelihood does not have funds for full-time study and where there are no extrinsic (only intrinsic) institutional rewards, is a poor competitor for the time of the triple-teaching academic. The same applies to rigorous research required for international peer-

reviewed publication: it is much easier and far more rewarding to triple teach and do consultancies.

The implication of the above is that the lack of knowledge production at Africa's flagship universities is not a simple lack of capacity and resources, but a complex set of capacities and contradictory rewards within a resource-scarce environment.

Conclusions

The main conclusion from the HERANA Phase 1 research is that the knowledge production output variables of the academic cores do not reflect the lofty ambitions expressed in their mission statements. With the exception of the University of Cape Town, none of the universities in the HERANA group seem to be moving significantly from their traditional undergraduate teaching role to a strong academic core that can contribute to new knowledge production and, by implication, to development.

Amongst the universities there is considerable diversity regarding input variables. The weakest indicators are the low proportion of postgraduate enrolments and the inadequate research funds for permanent staff, with the strongest input indicators in manageable student–staff ratios and well-qualified staff.

On the output side, SET graduation rates are generally positive. But there is a convergence around low knowledge production, particularly doctoral graduation rates and ISI-cited publications. The most serious challenges to strengthening the academic core seem to be the lack of research funds and low knowledge production (PhD graduates and peer-reviewed publications). The study also suggests that the low knowledge production cannot be blamed solely on low capacity and resources; the problematic incentive structures at these universities require further study.

These findings should be interpreted in a context that, according to the system-level analysis done by the HERANA project in Phase 1, there is inconsistency within and between African nations insofar as articulating the role of the university in development and

infrequent acknowledgement of the contribution of the university as a producer of knowledge to national economic development.

In terms of further research, there is a clearly identified need to improve and strengthen institution-wide capturing and processing (institutionalisation) of key performance indicator data and to focus more on key performance indicators more directly related to knowledge production.

For Castells, the education function, if injudiciously expanded, 'suffocates' the scientific research function. The market also offers competing rewards. Between teaching and the allures of consultancy, we can surmise that Castells's stern warning about balancing the functions for universities in developing countries is not heeded – and research consequently languishes.