Challenges and Opportunities for African Universities to Increase Knowledge Production

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**Acronyms**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tr>
<td>CHET</td>
<td>Centre for Higher Education Transformation</td>
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<td>HERANA</td>
<td>Higher Education Research and Advocacy Network in Africa</td>
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<tr>
<td>NMMU</td>
<td>Nelson Mandela Metro University</td>
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<td>NORAD</td>
<td>Norwegian Agency for Research and Development</td>
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<td>TUT</td>
<td>Tshwane University of Technology</td>
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<tr>
<td>UCT</td>
<td>University of Cape Town</td>
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<tr>
<td>UFH</td>
<td>University of Fort Hare</td>
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<tr>
<td>UKZN</td>
<td>University of KwaZulu-Natal</td>
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<td>WEF</td>
<td>World Economic Forum</td>
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Africa Needs Strong Universities

In the knowledge economy/society, universities have become politically and economically more important as institutions that produce and transfer knowledge. While it is certainly so that many other institutions form an important part of any national innovation landscape, universities are the only specialised institutions whose core business is knowledge, both its production and its reproduction and dissemination, including the education of the next knowledgeable (suitably qualified) generation (Maassen, in press).

Eight Basic Assertions

1. The importance of knowledge and higher education for sustainable development is global, even though there are contextual and regional differences in the way the relation between the two evolves.

2. Nevertheless, there are two things which are universal about this relationship. The first is that the sustainable, long-term beneficial contribution of knowledge to development is indirect, not direct. The reason for this is that – all the indices we have developed for counting knowledge outputs as a proxy for assessing its contribution to development aside – it is the longer-term knowledge generative capacity that underlies all sustainable development. Despite this, there are persistent attempts amongst policy makers and actors in development assistance to depict the relationship between knowledge and development as a direct one, usually to demonstrate relevance, utility, applicability and sustainability. There is a risk that this approach could lead to the conversion of the university into an applied knowledge producing institution, eroding its longer-term and far more critical mission, which is to produce the next generation capable of producing knowledge and innovation on a renewable basis.

3. The second universal feature is that the university remains, despite sometimes strident claims to the contrary, the best, the only producer of this self-renewing knowledge-producing capacity. The best index for this is the production of research-based PhDs. The university is much better at indirect, long-term knowledge capacity building than at direct short term knowledge application, at which many of the new knowledge institutions of the knowledge economy (parastatals, NGOs, etc.) are far more efficient. These adjunct institutions of the knowledge economy are dependent upon a vibrant university sector from which they draw their self-renewable knowledge generative capacity (new PhDs) without which they could not run, and on which they depend. This is why a vibrant secondary knowledge production landscape only occurs successfully in counties which have a stable PhD producing university sector – mostly the developed North.

4. In general the African universities are not strengthening self generative capacity, nor making a substantial contribution to new knowledge production. Neither governments nor development assistant actors see it as a priority to cultivate the university's capacity to produce knowledge generative capacity.

5. Governments in Africa often perceive national universities as being there to educate the next generation of state or civil service functionaries (mainly teaching model). When reforms are suggested they often involve prioritising short-term ‘relevance’, that is they point to a direct, unmediated, instrumental conception of the relation between knowledge and development, which is also encouraged by donors.

6. In the African context, Flagship universities have a crucial role as producers of appropriately skilled professionals, research skills, academic staff for other institutions
and as nodes for knowledge networks. Strengthening the Academic Core of the Flagship universities could be a driver for strengthening the tertiary education system.

7. Development agencies should adopt a holistic approach involving higher education institutions acting as engines of long-term sustainable development and avoid assuming that Africa requires a direct, short-term instrumentalist approach.

8. Development assistance actors, governments and institutions must pay more attention to forging an agreement (pact) on the importance of knowledge in development – particularly in competition with other development priorities, including resource extraction. (Cloete, 2012; Maassen and Cloete, 2011)
The Higher Education Research and Advocacy Network (HERANA) was established in 2008 with funding support from the US Foundation Partnership (Ford, Carnegie, Rockefeller and Kresge) and the Norwegian Agency for Research and Development (NORAD). The network is managed by the Centre for Higher Education Transformation (CHET) in South Africa and currently has more than 50 participating academics and university administrators from Africa, Europe and the US.¹

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 context in which universities operate, the internal structure and dynamics of the universities, and the interaction between the national and institutional contexts. It also aimed to identify factors and conditions that facilitate or inhibit universities’ ability to make a sustainable contribution to economic development.

The 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).

The next phase of the project involved the collection of data at both the national and institutional levels in eight African countries and universities included in the study.

1. Botswana – University of Botswana
2. Ghana – University of Ghana
3. Kenya – University of Nairobi
4. Mauritius – University of Mauritius
5. Mozambique – Eduardo Mondlane University
6. South Africa – University of Cape Town
7. Tanzania – University of Dar es Salaam
8. Uganda – Makerere University.

The countries included in the study were selected primarily on the basis of previous collaboration, and on the basis of World Economic Forum (WEF) ratings regarding location in the knowledge economy. CHET selected these eight universities because each is the most prominent public university in its country, and because each has broad “flagship goals” built into its vision and mission statements. Each of the eight universities aims:

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

The data base consisting of ten years of comparable data from eight African flagship universities is unique in the African context. This data set is already been used by the HERANA institutions to assess their enrolment and knowledge production strategies (Cloete and Bunting, 2011; Bunting, forthcoming).

¹ For more details see: http://www.chet.org.za/programmes/herana/
Knowledge Production

By knowledge production we mean the cluster of related activities in the university that has to do with producing new knowledge. The HERANA project regards these as masters and doctoral graduates and publications. We do not include consultancies, partly because we cannot count them and partially because consultancies are seldom part of the virtuous cycle of training, research, public and occasionally innovation (Cloete et al, 2011).

Masters Degrees: 2001-2011

Figure 1 shows how masters graduate totals increased over the period 2001-2011. The masters graduate total of the eight universities increased at an average annual rate of 12% over the period; from 2,268 in 2001 to 7,156 in 2011. Two universities were responsible for 66% of the overall increase of 4,888 in 2011 compared to 2001. They were Nairobi, whose masters graduate total increased six-fold from 370 in 2001 to 2,533 in 2011, and Ghana whose masters graduate total trebled from 541 in 2001 to 1,598 in 2011.

However, a major problem in Africa is the extremely low conversion from masters to doctoral enrolment. Normally the ratio is about four master’s students to one doctoral student. At UCT and Makerere the ratio is 3:1, meaning that for every three master’s students there is one doctoral student. However, at Nairobi the ratio is 40:1 and at Eduardo Mondlane, 60:1.

Doctoral Graduates: 2001-2011

Figure 2 summarises doctoral graduate totals over the period 2001-2011. The doctoral graduate total of the eight universities rose from 154 in 2001 to 367 in 2011. Cape Town, Nairobi and Makerere produced 80% of the doctoral graduate total of the eight universities in 2001, 82% of the total in 2007, and 76% in 2011.
In terms of gender, only Botswana has an above fifty per cent women enrolment at masters’ level, followed by UCT and Mauritius. At doctoral level only UCT and Botswana has more than 40% women.

**Research articles: 2001-2011**

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

In its analyses of research outputs, HERANA has considered research articles only. It uses the ISI’s arts and humanities, social science, and science-expanded citation indexes, and extracts from them all papers which contain at least one author whose address is that of one of the eight flagship universities. If the authors of a research publication recorded on a citation index are employed by different universities, then full units will assigned to each of the universities concerned.

Figure 3 summarises the research article totals for the eight HERANA universities. It shows that the combined output total doubled from 1 148 research articles in 2001 to 2 574 in 2011. The graph also shows that the output of research articles was, like that of doctoral graduates dominated, by Cape Town, Nairobi and Makerere. These three universities produced 80% of the overall research article total in 2001, and did so again in 2011.
Senior Staff

Figure 4 covers the period 2009–2011. The graph takes “senior academics” to be those in the categories of professors and associate professors. The “senior academic” category is important because research leaders, particularly of research groups, should ideally be either professors or associate professors. The focus is on academic staff members with doctoral degrees because they are obviously a key input as far as the production of research is concerned.

Permanent academic staff in this qualification category should be the major producers of research outputs, and at an input level, the main supervisors of doctoral students. In South Africa a study of all academics showed a correlation of 0.83 between having a doctorate and publishing, meaning that it is only in exceptional cases that a junior staff member without a doctorate publishes an ISI article.

In terms of strengthening research output, the data for eight African flagship universities show that:

- Except for UCT and Makerere, there is a pipeline problem between master and doctorate
- That the doctorate output, with the exception of UCT, is very low and it can be expected that this will affect the ability of the institution to publish in international journals
- With the exception of UCT, the African flagship universities do not seem to have enough senior staff at the professoriate level to provide research leadership.
South African Case Studies

Apart from postgraduate and staff profile, CHET decided to investigate what measures and practices South African universities employ to strengthen research output. We selected five case studies based on the following assumptions. The first was that account should be taken of the three institutional categories used in higher education planning in South Africa, with a spread of institutions with different histories. The second was that there should be evidence of growth in the high level knowledge inputs and outputs of each university, and in particular in those which do not appear in the top cluster of high level knowledge producers.

The institutions selected included three universities (Cape Town [UCT], KwaZulu-Natal [UKZN] and Fort Hare [UFH]), one comprehensive university (Nelson Mandela Metro [NMMU]) and one university of technology (Tshwane University of Technology [TUT]). The list contains one historically white (UCT) and one historically black university (UFH) which were not affected by mergers. UKZN was created by a merger between a historically white and historically black university, and NMMU was a merger of a historically white university with a historically white technikon. TUT and UKZN are large institutions with enrolments over 30 000, two (UCT and NMMU) are medium sized, with just under 20 000, and Fort Hare is a small university with just under 10 000 enrolments.

We use UFH as a case study both for historical and comparative reasons. UFH is famous for producing leaders, including two South African presidents (Mandela and Mbeki). However UFH had not developed a serious knowledge producing strategy, which it did under new leadership since 2005.

University of Fort Hare (UFH)

Vision and performance

UFH’s overall vision is aspiring to be a vibrant, equitable and sustainable African university, committed to teaching and research excellence. Its aspirations as far as research is concerned are to contribute to the advancement of knowledge that is socially and ethically relevant. UFH is smallest of case study universities selected, with 10 700 head count students in 2010 and 292 permanent members of academic staff. Its average student enrolment profile for 2008-2010 was 84% undergraduate, 14% postgraduate up to doctoral level and 2% doctoral enrolments.

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2 The merger exercise in South Africa (2003) resulted in a higher education system with 3 types of institutions: Universities (11), comprehensive universities (6) and Universities of Technology (6).
### Table 1. UFH Research inputs and outputs

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<tbody>
<tr>
<td>Doctoral enrolments</td>
<td>155</td>
<td>227</td>
<td>263</td>
<td>70%</td>
</tr>
<tr>
<td>Permanent academic staff</td>
<td>292</td>
<td>347</td>
<td>291</td>
<td>0%</td>
</tr>
<tr>
<td>Permanent academics with doctorates</td>
<td>55</td>
<td>89</td>
<td>102</td>
<td>85%</td>
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<tbody>
<tr>
<td>Research articles</td>
<td>63</td>
<td>120</td>
<td>168</td>
<td>167%</td>
</tr>
<tr>
<td>Research conference proceedings</td>
<td>3</td>
<td>4</td>
<td>9</td>
<td>200%</td>
</tr>
<tr>
<td>Research books</td>
<td>7</td>
<td>9</td>
<td>4</td>
<td>-43%</td>
</tr>
<tr>
<td>Research masters graduates</td>
<td>37</td>
<td>53</td>
<td>121</td>
<td>227%</td>
</tr>
<tr>
<td>Doctoral graduates</td>
<td>10</td>
<td>34</td>
<td>44</td>
<td>340%</td>
</tr>
<tr>
<td>Weighted research subsidy total</td>
<td>140</td>
<td>288</td>
<td>434</td>
<td>210%</td>
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</table>

Albeit from a low base, UFH’s increase of weighted research subsidy by 210% and doctoral graduates by 340% is amongst the highest in South Africa. UFH’s improved output continued in 2012; the number of doctoral graduates increased from 44 (2011) to 50 and the accredited publications from 168 (2011) to 180 in 2012.

**Research policies and implementation strategies**

In the case study report that UFH wrote for this study, it says that prior to 2006 interaction with national policy frameworks, knowledge production initiatives, and research facilitating structures was sporadic, fragmented and uncoordinated across the university. There was no strategic drive institutionally to interact with these policy frameworks. This situation changed after 2006, since UFH wanted to avoid being classified as a low ranked teaching institution in South Africa. That was important since it has historically been closely connected to the state power.

The changes that occurred were underpinned, firstly, by a realisation that research capacity development for academic staff and postgraduate students was a priority for UFH. This was connected to centralisation and strengthening of research administration which allowed for a greater sense of planned facilitation, monitoring and evaluation of research efforts. Further interventions were the development of a strategic research plan for 2009-2016, and the development of a set of research policies aligned to national strategic priorities.

UFH’s case study says that the 2009–2016 strategic plan was supported by a philosophy and strategy that recognised the need for research to address local, regional and national needs. It committed UFH to engage in a critical dialogue with partners to build research in areas which would complement the university’s historical niche as an African university, while ensuring that it would achieve internationally recognised excellence. The document stresses that UFH recognises that research is led and driven by individuals and groups with a vision and passion to seek answers to questions that bother them. Because UFH recognises that postgraduate students should be part of research, its research administration includes postgraduate studies, although the disciplinary scholarship task of postgraduate degrees fall under direct faculty control.
The case study adds that UFH’s research strategy embeds itself at the “bottom end” of the scholarly process by facilitating research methodology renewal and workshops on applied research practices. It also continues to support well established areas of excellence and to facilitate the growth of these research niche areas. The following research niche areas have been in place at UFH, with the support of the National Research Foundation: Sustainable agricultural and land use strategies, Water resources for sustainable development, Renewable energy research on systems, resources and economics, Culture, heritage and social transformation and Unlocking the potential of indigenous plants for sustainable livelihood.

UFH has also embarked on a new strategy to develop or redevelop and strengthen successful research niche areas. This has been assisted by the introduction of the research chairs initiative of the National Research Foundation. UFH received in 2010 a chair in social change, and in 2012 another one and a half chairs in biodiversity and meat science.

In a further attempt to focus research institutionally a number of research institutes, units and centres have been established with, what the briefing document describes as, varying success. In total, UFH has 19 different research units, centres or institutes. No policy framework has been in place to guide the establishment of such entities, but in the 2010 academic review of research a set of guidelines were developed for the restructuring and repositioning of these entities. These guidelines will address the confusion about nomenclature, funding, governance, research capacity and research output.

Some specific steps which UFH has taken towards the implementation of its research strategy are these:

- Targets have been set for the annual totals of accredited research outputs which the institution is expected to produce.\(^3\)
- Seed research funding is provided for new academic staff members,
- Papers are harvested from completed dissertations and theses. To promote knowledge production, awards are made for 6 month periods to doctoral graduates to stay on and extract at least 3 publishable research papers from their completed studies.
- Postdoctoral fellowships of $15 000 per annum are allocated to faculties for projects which are consistent with the strategic objectives of UFH. In 2012 a total of 7 fellowships were being funded by UFH.
- Experienced academics, researchers and experts from educational, public and private sectors are recruited to serve UFH as specialists in their respective fields. They are employed on a part-time basis as emeritus or adjunct professors, fellows or associates to supervise postgraduate students, conduct and publish research, provide cutting edge information, deliver quality lectures and secure and manage consultancies.

**Research organisation and management**

UFH has a central university committee for research and development. The main functions of the committee are to oversee the implementation of UFH’s strategic research plan, including the introduction or amendment of research policies, and to approve the research budget. This committee is chaired by the Deputy Vice-Chancellor: Academic Affairs. The Dean of Research reports to this Deputy Vice-Chancellor. All other deans and directors with a research mandate report quarterly to the Dean of Research on research activities.

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\(^3\) It is also important to be reminded that the University has set for itself a target of 1.35 as an inclusive accredited research output target at the 2012 strategic planning workshop. The University succeeded to reach 1.26 as an inclusive accredited output target in 2011/12.
The staffing data in the diagram show that in 2010 UFH had, not counting the Deputy Vice-Chancellor, a total of 11 staff members in its research management, who could be classified as holding professional posts (i.e. posts which require incumbents to have at least a four-year higher education qualification). Some ratios which can be used to measure the extent of UFH's research support are these:

- In 2010 UFH had a total of 292 permanent academics. Its ratio of permanent academics to professional research support staff was 27:1, compared to UCT’s ratio of 25:1.
- Suppose that a university’s active researchers are taken to be all permanent academics with doctorates. UFH’s 2010 total on this definition of “active researcher” would be 95, and its ratio of active researchers to professional research support staff would be at 9:1, the same as UCT’s 2010 ratio.

**Research funding**

UFH appears not to have included external research income, such as National Research Foundation and contract research grants, in its briefing document. It refers only to research income derived from government subsidies.
Table 2. Estimate of UFH’s 2010 research income from government subsidies

<table>
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<tr>
<th>Source of research funds</th>
<th>US Dollars (millions)</th>
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<tr>
<td>Government subsidy for research development</td>
<td>1.2</td>
</tr>
<tr>
<td>Government subsidy for research outputs</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Total income</strong></td>
<td><strong>1.6</strong></td>
</tr>
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</table>

If UFH’s research funding total for 2010 was $1.6 million, then its research income per permanent academic would be $5 500, which was 6% of UCT’s average of $92 600 per permanent academic.

**Research incentives for academic staff members**

UFH uses these incentives for research outputs:

- $2000 is paid for each accredited research article. If an article has more than one author, the money is shared between them.
- $2000 is paid for each masters graduate and $6000 for each doctoral graduate. If a graduate had more than one supervisor, then the amounts are shared between them.
- Winners of the vice-chancellor’s senior and emerging researcher medals receive cash awards of $1500.

**General approach**

The case study stresses that the collapse of apartheid had major impact on the academic management as many senior white academics were offered severance packages. As a result the research culture was to a large extent eroded.

The 2009-2016 strategic plan and the subsequent institutional research targets, were major steps to demonstrate the intentions by management to strengthening the research production. The focus was to develop the institutional policy and drive implementation from the top rather than prioritise capacity building components that would strengthen the research outputs.

According to the case study report, the research strategy operates at an interlinked number of levels that ‘embeds itself in the ‘bottom end’ of the scholarly process, supports the well established areas of excellence, the growth of niche areas, attempts to identify new areas of research foci and enables a ‘rewarding research context’ (p3).
Broad Conclusions from Five Case Studies

The overview of the case studies show that all five universities have research strengthening policies and practices in place that could be categorized broadly into activities/functions such as:

- **concentration of research** - themes, groupings, signature themes, centers of excellence, research chairs
- **develop researchers** - recruiting for and promoting doctoral studies and post docs, support to junior academics – with different types of programmes to address race and gender equity
- **knowledge production skills** - these usually involve workshops/training in research methodology, writing skills, meeting publication requirements, fund raising and management
- **incentives and rewards for knowledge production** - these range from direct cash and benefits such as promotion, to indirect incentives and status enhancing rewards
- **intellectual property and commercialization** – provides administrative and legal (contract) advice, facilitate partnerships with industry and government, grant management assistance, etc
- **contribute to policy** – initiates or are involved in new institutional polices about strengthening or expanding research output
- **building and or strengthening research culture** - this ranges from trying to build a culture where there is none, to strengthening the existing culture.

Another way of classifying the seven functions identified above is; **development – support – incentives**. While it is not easy to draw a sharp divide between these three types of functions, they do have different emphases and methodologies. Development deals mainly with broader capacity building, which ranges from further studies to skills enhancement. Support is mainly around specific skills, often legal and financial assistance with aspects such as commercialisation, grant applications and funds management. Direct incentives are predominantly output orientated, while indirect incentives are more orientated towards career development and high status awards. Depending on academic capacity and/or managerial capacity, institutions focus more or less on a combination of the three approaches to support and whether it is a centralized or decentralized management strategy.

In terms of the above classification, it could be argued that UFH utilise all three approaches; development-support –incentives, but with a stronger emphasis on development and incentives.

Three interesting issues to emerge from the overall (five) case studies are:

- Strong indications of following the international trend of mimicking strategies and structures – mimetic normative isomorphism;
- Expanding the professional managerial ‘class’ in the universities; and
- Confused methodology about claiming success for the research strengthening offices/units.

Briefly, what the above means is that there is a strong move towards establishing research offices, with a number of senior positions, which looks like the research offices of high

4 The tendency of an organisation to imitate another organization's structure because of the belief that the structure of the latter organization is beneficial.
knowledge producing universities, without having the senior academics or the resources to emulate the high productive institutions. In this process too many senior management positions are established, which in turn could lead to bureaucratisation, rather than productivity. Ironically, while this new bureaucracy puts in place efficiency and productivity targets for the academics, there are no agreed upon methods or indicators to judge their own efficiency and success.
References


