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THE SOUTH AFRICAN DOCTORATE

WHERE TO NOW?

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INTRODUCTION

Since South Africa emerged from its isolation in 1994 it has aspired to become a player in the knowledge economy. In this context the PhD is considered to be an indicator of a country's developmental capacity and a key driver of the economy. Doctoral students are considered to be the knowledge workers who will spearhead research and development. The Department of Science and Technology (DST) envisioned a fivefold increase in the number of PhD graduates, especially in science and technology, in the span of a decade in order for the country to compete in the global arena (DST 2008).

In this chapter I take a snapshot of the South African doctorate in the context of massive global expansion of postgraduate education which has been taking place over the last two decades. I discuss the various policies that have been put in place to drive the envisaged expansion and argue that it is critical that doctoral education in South Africa continues its path of expansion. The historical data shows this trajectory and captures the particular nuances of this growth. I further argue that growth without quality defeats the purpose of the expansion; hence this chapter seeks to look at how the growth may be sustained and indeed increased while simultaneously improving the quality of doctoral education.

But before discussing the future of the doctorate, it is important to reflect on where we came from and the way the trajectory of the doctorate in South Africa has shifted and moved over time expanding race, gender and disciplinary boundaries.

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DOCTORAL EDUCATION IN SOUTH AFRICA: HISTORICAL OVERVIEW

The doctorate has a long history in South Africa. According to the University Incorporation Amendment Act of 1896 the Council of the University of the Cape of Good Hope had the power to confer, after examination, several degrees of Doctors of Law, Doctor of Medicine, Doctor of Science and Doctor of Music.

The first LLD was awarded in 1899 to William Alison MacFadyen and the first DSc was awarded in 1907 to Charles F Juritz. PhDs were awarded since the early 1920s at the University of Cape Town. Since then South Africa has awarded about 31 000 different doctoral degrees. It is interesting to compare it with Australia, which only began to award PhDs in 1948, but has since awarded more than 100 000 various doctoral degrees with less than half of South Africa’s population (Dobson 2012).

One of the main reasons for the small number of South African graduates is its traditionally elitist nature which until 1990 had privileged white men. After the 1990s, however, there was both expansion and diversification – in fact, over 60% of the total number of PhDs were awarded in South Africa (19 000) after 1990.

Between 1996 and 2012 there was a steady growth in the number of PhD graduates per annum, with the average growth being about 6% per year (Figure 4.1). It seems that South Africa has tripled the number of doctoral graduates since the transition to democracy, with a significant growth after 2007 following the initiation of the South African PhD project (NRF 2007).

FIGURE 4.1 Doctoral graduates in South Africa per annum 1996-2012 (Source: Higher Education Management Information System (HEMIS) Tables 2 and 13 for all institutions 1996-2012)

Figure 4.2 indicates that the growth in the number of graduates is largely attributed to the recruitment of international students, which is another government policy aims at establishing South Africa as “a hub for higher education and training in the region” (NPC 2011,279) and a top destination for international students (DHET 2011, 40). International students constituted 19% of all graduates in 2000 and the percentage went up to 34% in 2010. The majority of the international students are from the Southern African Development Community (SADC) countries and the rest of Africa.

FIGURE 4.2 Doctoral graduates by nationality 2000-2010 (Source: HEMIS)

The analysis of the doctoral awards in terms of general fields of study shows that up to 2009 the highest percentage of awards was made in the field of the social sciences, while the lowest numbers came from engineering sciences, material and technologies. Since 2008 there has been a significant increase in the number of awards in the natural and agricultural sciences; and this increase may be an indication that the initiatives by the DST and NRF to increase the number of graduates in these fields are bearing fruit. However, the nearly flat line that is evident in the awarding of PhDs in Engineering Sciences remains a source of concern if South Africa wants to increase research and innovation in these fields (Figure 4.3).

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FIGURE 4.3 Doctoral graduates by field of study, 2002-2012 (Source: HEMIS)

Another policy initiative focused on increasing the number of women and black graduates. At the time of the transition to democracy, PhD graduates in South Africa were overwhelmingly white (87%) and male (65%). Fifteen years later, significant advances had been made, and in 2011 for the first time the number of African male graduates exceeded that of their white counterparts. However, the argument that the distribution of PhDs is not demographically representative is still valid (Figure 4.4). Women constituted about 42% of the total graduates in 2011.

FIGURE 4.4 Doctoral graduates by race and gender 1996-2011 (Source: HEMIS)

While this improvement in racial representation is significant, it should be noted that the representation of non-South Africans is highest among black graduates. In 2011, 52% of the black graduates were non-South African, further adding to the argument about the shortage of black South African graduates (Figure 4.5).

FIGURE 4.5 Doctoral graduates by nationality and race, 2011 (Source: HEMIS)

THE CURRENT STATE OF THE DOCTORATE: POLICY AND PRACTICE

With the spotlight on the doctorate as a driver for economic development, policy makers benchmarked the South African PhD in relation to other countries also identified as knowledge-driven economies. The picture was not very flattering. It appeared that in 2007 South Africa produced 27 PhDs per million of population per year while other middle-range knowledge economies produced between 100 and 250 PhDs per million of population annually (ASSAf 2010:46).

The first policy step was to set an indicator and to signpost the target in a quantitative manner, in other words, how many PhDs do we need in order to build a knowledge-based economy?

There were slight differences between documents but overall the target was set at 6 000 doctoral graduates per annum by 2018 (DST 2008) or by 2025 (NRF 2008), with 3 000 coming from the fields of science, engineering and technologies. More recently the National Development Plan’s objective has been to produce more than 100 doctoral graduates per million per year by 2030, which implies an increase to 5 000 a year by 2030 (NPC 2011:66). While the common intent is a rapid and significant increase in the number of PhDs, these different goalposts could indicate the adjustment of policy to the realities.

The second step was to have a consensus report on how to meet the target. The Academy of Science of South Africa (ASSAf) commissioned a series of studies to provide evidence-based advice to policy makers on the status of the PhD and what would need to be done in order to escalate the number and quality of doctoral graduates.

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Some of the studies were aimed at exploring what leaders of PhD programmes at universities as well as those working with PhD students in industry, national research facilities, centres of excellence, funding agencies or the end users of the PhDs think about the degree. The studies also investigated what models of training are used in effective PhD programmes and their purposes, strengths, weaknesses and threats. The research inquired about the barriers as well the enabling factors for students' success in these programmes, and what it would take to scale up these models. The studies followed what Elmore (1980) described as a backward mapping approach to policy development by starting with the end results in order to provide policy makers in South Africa with guidelines on what needs to be done in order to improve the quantity and quality of PhDs. The results of the various studies were published in 2010 (ASSAf 2010).

Drawing on this report the following findings are pertinent here. It was found that PhD programme leaders in South Africa tend to view the PhD as a preparation for academic career. Whether in law, humanities, science, education, mechanical engineering or the biomedical field, programme leaders appear to see the goal of the PhD as that of training lifelong scholars and thereby producing the next generation of academics. This view is underscored in the Backhouse (2009) study which identified similar attitudes. Backhouse interviewed supervisors representing pure and applied hard disciplines (mathematics and engineering) as well as pure and applied soft disciplines (English and development management). She argued that supervisors across the four disciplines tend to understand the purpose of the PhD as that of generating knowledge for undertaking research. That is Gibbons's Mode 1 type of knowledge.

Some academics who view the PhD as a preparation for academic life, were inclined to reject the view that South Africa needs more PhDs, articulating as their concern the fact that quantity means less quality and indicate their preference for a fewer PhDs with a greater impact. However, this view often raises the rebuttal that keeping the PhD elitist will perpetuate its racial inequality in the country.

Alongside this traditional understanding of the PhD as preparation for an academic career, there is also the view of the doctorate as an applied PhD, whose purpose it is to prepare students for a profession. The programmes in this mode often include some course work and cater for a large cohort of students. However, the implementation of this type of doctorate in South African universities has been highly dependent on individual or departmental entrepreneurial initiatives, sometimes with little institutional or policy support.

A third view sees the main role of the PhD as that of a service to industry. PhD programmes in the sciences are breaking disciplinary boundaries and forging different partnerships with industry, ranging from programmes which are exclusively established around the needs of an industry to those which attempt to find a comfortable balance between applied (Mode 2) and fundamental (Mode 1) research. While some supervisors feel that all knowledge should be applied, others feel that this is not the purpose of a PhD.

The ASSAf report identified a number of barriers that may stand in the way of expansion. Significantly it pointed out that the pool of potential doctoral students is too small. While some PhD programmes have to turn away students because of the lack of physical laboratory space or the lack of supervisory capacity, most programmes were struggling to find suitable students. Competition is rife for quality students and in particular for black quality students, especially (but not exclusively) in science and engineering. Some programme leaders recruit black students from SADC countries and from elsewhere in Africa in order to comply with the equity targets, as they have found that such students are generally better prepared and more dedicated than their South African counterparts and that they also have fewer family responsibilities (ASSAf 2010). Some PhD programme leaders face the challenge by beginning their recruitment efforts at undergraduate or honours levels thus 'growing their own timber'. The main reason for this practice is to ensure that the PhD students have a solid background knowledge and are capable of managing higher learning. At the same time this practice would limit the pool and the diversity of potential students. One way of escalating the number of PhDs could be to highlight this practice and to fast-track the process from honours degree to PhD. This would require an adjustment to the way universities are funded as such an innovation might mean the loss of the present university subsidy for master's degrees.

Most important, escalating the number of PhDs would also require decreasing the drop-out and repetition rates at undergraduate and postgraduate levels. CHET (2013) has undertaken detailed individual tracking analyses for cohorts of doctoral students entering the South African university system for the first time in 2001, 2002, 2003, 2004 and 2005. The average graduating rate after six years across universities in science and technology programmes was 55%, while the average graduating rate in the social sciences after six years was 51% for the 2004 and 2005 cohort.

The ASSAf report concluded that South African universities, on their own, did not have the capacity to deliver the expected target. One of the suggestions was to seek international collaboration as well as public private partnerships. Increasing the number of PhDs by forging partnerships with industry is complex. The ASSAf studies

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included interviews with a number of key people in major state-owned enterprises (SOEs) or public industries in South Africa, such as SASOL (South African Coal, Oil and Gas Corporation Ltd), Telkom (Telecommunication), Sappi (pulp and paper company group) and DeBeers (exploration, mining and trading of diamonds) as well as big private companies. These are the main industrial supporters of doctoral education in South Africa, whether through bursaries and subsidies or by providing training. While most industries provide financial support for the PhD as a social good, or even for the public image, answers to the question of whether the industry itself needs doctoral graduates differ greatly between those industries that have a strong focus on research and development (R&D) and those that require more operational skills (Herman 2013). So for example SASOL has a strong emphasis on R&D, and thus has a need for PhD graduates (Cele 2005). For some other industries, though, the PhD is not only unnecessary but is even seen in some cases as a luxury, with a master's degree providing sufficient skills. The low interest in the benefits of a doctoral education may therefore relate to the overall commitment to R&D in the country, which is low in relation to global benchmarks. The research conducted by Herman (2013) even detects a reluctance on the part of a number of industries to support doctoral students, a feeling strongly linked to the nature of industry in South Africa and to the perception that once they have graduated they will be lost to the companies and even to the country as part of the brain drain which is occurring from the developing to the developed countries. A great concern to the industry is the quality of the doctoral work based on the perception that universities in South Africa struggle to retain their top supervisors, despite industry initiatives which supplement the salaries of academics in key positions (Herman 2013).

A similar concern with quality and relevance was detected in a study seeking employers' perspectives on PhD graduates (CREST 2009). The study set out to survey institutions that specifically targeted graduates, such as science councils, national facilities, NGOs, other non-profit organisations and the government sector, as well as the private sector. Though the study was limited, the private sector employers felt that aside from business or financial administration, a PhD was an unnecessary degree. Employers in the fields of natural sciences and social sciences saw much value in the degree but identified a number of weaknesses with the South African PhD. These included the isolation of the graduates and their lack of exposure to international expertise and debates; the lack of quantitative and statistical grounding, a theoretical rather than a practical base, and weaknesses in conceptualisation and management of research reports and projects.

Another important barrier to the escalation agenda has to do with the supervisory capacity. Only about 36% of all lecturers at public higher education institutions have PhDs (ASSAf 2010:59). The CREST report assesses supervisory capacity as a ratio between the number of permanent academic staff with PhDs and the number of doctoral students. The norm was approximately two doctoral students to one doctoral staff member at universities and approximately 1.2 doctoral students per doctoral staff member at universities of technology. In reality, the supervision load is not shared equally among the academics with PhDs. Reputable and experienced supervisors with a good completion record may have 5-10 doctoral students, while others may have 1-2 students or even none. These ratios do not capture the full supervisory load of doctoral staff as some doctoral staff are responsible for supervising master's students (CREST 2009:13). In 2005 the ratio was 5.2 students per supervisor (CREST 2009). Furthermore, since higher education in South Africa has become teaching intensive, the burden of undergraduate teaching is high.

Other identified blockages in the system were the prevalence of the one-to-one model of supervision that may be a hindrance to escalating the number of PhDs, the bottleneck into higher postgraduate studies created by the honours degree, a lack of support for doctoral studies or recognition in the value of the award in all levels of society as well as policy that only recognised the traditional, academic PhD, while overlooking the role of the PhD as a producer of knowledge that is applicable to the workplace and the industry. The ASSAf report recommended that expanding the PhD requires a more flexible award which can facilitate innovation and collaboration.

Subsequent to the ASSAf recommendations, the NRF carried out a planning exercise in 2011, discussing what it would take to produce 6 000 PhDs per annum by 2020 (with the possibility of extending it to 2030, depending on financial constraints). This was the third step. The findings were published in a recent NRF document: *Scaling up the South African Research Enterprise 2011-2020* (NRF 2012). It suggested that the target of 6 000 PhDs in 2020 could be achieved by creating additional research chairs and centres of excellence and by supporting sandwich programmes – in other words, sending students to international partners. However, in order to do so the NRF would have to add by 2020 some R5.9 billion a year to the existing 2011 allocation level (NRF 2012). As I have mentioned, this was a planning exercise and not a commitment, but it nevertheless sends a clear message that enhancing the quality and quantity of the PhDs requires serious funding and political will.

The fourth step was to review some of the policies that relate to the PhD. This is ongoing and there are some processes and programmes in place. For example, the Department of Science and Technology (DST 2008) extended its programme

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to “Improve Academic Qualifications of Academic Staff and Researchers” and allocated funding to accelerate the training of doctoral students. Through this programme academic staff could take a sabbatical of between 6 and 12 months in order to complete their doctorates. The NRF also shifted its funding priorities from established researchers to new and emerging researchers.

Another policy change is the new HEQSF (DHET 2012), which attempts to develop a professional pathway as an alternative to the traditional PhD. The field descriptors of the different qualification have recently been published and the jury is still out on the impact this change will have on the practice (RSA 2013).

Professional doctorates are well established in the USA and have been so since the 1990s in Australia, New Zealand and the UK (Boud & Tennant 2006; Scott, Brown, Lunt & Thorne 2004; Servage 2009). Professional doctorates target mature students in their mid-career. They usually offer a fast-tracking doctoral research programme through the introduction of coursework, as well as the development of relevant professional knowledge. However, the system is not without its critics. There are questions about the quality and scope of the research that is carried out in such doctorates (Bitusikova 2009). It is argued that professional doctorates do not constitute a radical departure from the traditional PhD, and that the real differences lie in the target populations, in the selection criteria, and in the ability of the students to pay their fees (Neumann 2005, 2009). There is also the suggestion that the expansion in professional doctorates reflects entrepreneurial attitudes by universities, rather than a demand by the labour market for more doctorates (Servage 2009).

While introducing another type of doctorate might expand the number of PhDs it is possible that the introduction of professional doctorates to South Africa may not in itself help the country to become a knowledge economy. This is mainly because the DST/NRF vision emphasises increased PhD production in the sciences and technologies, whereas professional doctorates, with the exception of engineering, dominate the social services professions such as education, psychology, business and nursing. In other words, the professional doctorates do not serve the disciplines that are considered to be critical to the development of a knowledge economy. As a latecomer to the policy debate on doctoral education, South Africa can benefit from expertise of other countries. The trajectory and evaluation of professional doctorates in Australia, which are currently in decline (Pearson, Evans & MacAuley 2008), can serve as a case study.

THE WAY FORWARD

The backward mapping exercise indicates that there is a perception, especially among stakeholders in the industry and private providers, that some of the skills required for the knowledge economy can be provided by master's degrees, especially in engineering and technology. It shows the ambivalence toward the function of the PhD among supervisors as well as the end users, and highlights concerns about quality and capacity, all of which are serious challenges to the expansion drive.

At the same time the message was clear: we need more PhDs. Universities need more PhDs in order to keep up with the demand for higher education, especially master's degrees. Our society needs more PhDs so we can think differently about our social and political issues. We need more research and innovation. The main challenge for South Africa is how quickly the number of PhDs can be expanded while maintaining the required quality. Manuel Castells (2009), in a seminar discussing the ASSAf report, argues that there can be no compromise on the quality of the doctorate and that it is better to have a few good PhDs than many mediocre graduates. Only by building a cohort of good PhDs can we expand our supervisory capacity. Only good PhDs can change the end-user perceptions of the degree and enhance the value of the award. Similarly, Jonathan Jansen argues that we need doctoral research that will have practical, theoretical, emotional and personal significance if we want it to make any difference in the world of scholarship (Jansen 2011). Many of our doctoral students are actually in the field of academia. We need to make sure that the next generation of supervisors will have quality PhDs. Leo Rosten, a Jewish Polish teacher and academic, was quoted as saying in 1970, "First-rate people hire first-rate people, second-rate people hire third-rate people." By applying Rosten's law to doctoral education we can say, "First-rate supervisors produce first-rate graduates, second-rate supervisors produce third-rate graduates". The triumph of mediocrity means creating a chain reaction effect that will work against innovation, quality and originality.

In building the case for PhD expansion without compromising quality I suggest the following points of attention.

a) Increasing supervisory capacity

There is an urgent need to train supervisors. A number of PhD programme leaders in South African universities stress that not enough is being done to ensure that inexperienced supervisors, such as recent PhD graduates, or unsuitable supervisors, such as those without PhDs, should not supervise doctoral students (Herman 2009). Formal training, monitoring and accountability of supervisors can counteract some of

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these problems. The departments or the institution can provide ongoing professional development to supervisors.

Monitoring the quality of the supervision needs to be part of a system for quality assurance in doctoral education. There is growing attention in Europe and elsewhere to issues of accountability, quality enhancement and the creation of a quality culture engaging management of doctoral education, based on both internal and external evaluation mechanisms (Byrne, Jørgensen & Loukkola 2013). Lessons learned from such systems could form a base for quality assurance processes in South Africa.

b) Introducing official part-time status

Another barrier to producing good quality PhDs is the pressure to produce more PhDs and to ensure that these should be completed in three to four years. Brenda Wingfield (2011) from the Faculty of Science and Technology at the University of Pretoria argues: "The last thing we need is 'rushed job' degrees or students who could have completed in that extra year, but have terminated their studies because of pressure to complete in a period inappropriate to them." Considering that many of our students are more mature, have families to support and are working full- or part-time, finishing the degree in 3-4 years often produces mediocre PhDs. A way forward could be an official part-time status for our PhD students, whereby completion time could be five to six years, without penalising our institutions, thus following other international examples such as Australia, the UK and Canada (Nerad & Heggelund 2008). This view is supported by Evans (2002) who maintains that having part-time enrolment can benefit those students who avoid full-time enrolment because of work, family or community commitments. At the same time, part-time enrolment can be an underlying force for the diversity of the doctoral student population and can support South Africa's expansion agenda, albeit at a slower pace.

c) A call for sustained dialogue on doctoral education in South Africa

Doctoral education in South Africa is in flux. The discourses of the global economy and government intervention are changing the way in which doctoral education is conceptualised, perceived and delivered. There is increasing diversity in the provision of the degree as well as diversity in the student population. Students are working at the boundaries of many sites and disciplines. It seems that South Africa is scoring some success in increasing the number of graduates, especially in natural and agricultural sciences, though not as quickly as it would like to. And maybe this is a good sign as we may not yet be ready to expand at a faster rate. The South African doctorate is at a crossroads between government policies, universities' histories, departments'

traditions, disciplines' knowledge, the standards and ethics of supervisors, and the expectations and needs of the end users. In order to move forward we need to engage with these boundaries in a critical way and have a sustained dialogue on the role that academia and the PhD should play in knowledge creation. We need to discuss what kind of doctorate we want our graduates to have, and how to ensure the quality of the award. We need to further explore the link between doctoral research and the country's position in the knowledge economy, and how we can graduate PhDs with the knowledge and competencies to contribute to scholarship, society and to the needs of South Africa's emerging economy.

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