ACHIEVING RESEARCH IMPACT FOR DEVELOPMENT: A CRITIQUE OF RESEARCH DISSEMINATION POLICY IN SOUTH AFRICA

POLICY PAPER

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CHAPTER ONE: INTRODUCTION

Preamble

This paper is written from the perspective of a scholarly publisher with many years' experience as a university press director and an academic publisher in South Africa, and as a consultant on the use of digital media for effective scholarly publication in Africa. As a publisher, my concern must be to ensure the most effective way of packaging and distributing research content to the audience for which it is intended. I have experienced at first hand the difficulties of scholarly publishing in an African country and the inequities that characterise the global scholarly publishing system. This paper is underpinned by that concern, and draws on that experience.

Publishing scholarly output is hindered by a lack of resources, arising from an unwillingness on the part of both government and higher education institutions to fund research publication – or even to regard scholarly publication as something that ought to be funded. Markets are small for those print publishers trying to work in a commercial model, leading to high prices and market resistance.[1]

Africa's presence in global scholarship

Distribution of print publications between African countries is difficult, given very high transportation costs, tariff barriers and exchange control regulations (Gray 2001). To this can be added the difficulties raised in national and international markets by the 'journals crisis': university libraries in African and developed countries are equally unwilling to buy or subscribe to what are seen as peripheral publications, given the pressure on their budgets from the ever-escalating cost of the mainstream Thomson-indexed journals.

It is not surprising that then Africa is poorly represented in global scholarly output. Statistics published by UNESCO in 2000 showed that 72 per cent of book exports worldwide come from North America, the United Kingdom and Western Europe. In Africa, the market is particularly badly skewed. According to research by the African

[1] It is not always understood by those unfamiliar with the publishing industry that the single biggest factor contributing to high prices in developing country publishing industries is the fact that book prices are linked to print volumes: the higher the sales potential, the larger the print run, and the lower the price of the book. Exports, particularly into the lucrative markets of the rich OECD countries, are therefore a tantalising prospect, with the possibility of good sales in strong currencies. A major thread in the argument in this paper is the multiple barriers that are raised to such South-North trade.

Publishers' Network, Africa consumes about 12 per cent of all books produced in the world but contributes less than 3 per cent to books read in the world (Wafawarowa 2000). Even starker is the balance of content on the Internet:

> While researchers studying ICT use in developed countries may not identify content as critical, it cannot be ignored in our context. The African continent generates only 0.4% of global online content, and if South Africa's contribution is excluded, the figure drops to a mere 0.02%. (Czerniewicz & Brown 2004)

In approaching the question of research dissemination in Africa, therefore, I recognise a fundamental need to develop policies and strategies that would increase the output and enhance the effective dissemination of African research, for African development (in the widest sense), in the most appropriate media and in the most accessible formats.

The context of this report

This report is the outcome of research I undertook as a 2006–7 International Policy Fellow of the Open Society Institute (OSI), Budapest, in the Open Information Policy Working Group. The mandate of this group, as its name suggests, is to promote policies for open communications, building on the potential offered by new technologies and alternative intellectual property (IP) regimes:

> Advanced by the Internet, alternatives to long-standing intellectual property regimes have created an environment to re-assess the relationship between democracy, open society and new information technologies. The promise of open source technology with respect to civil society and the incalculable leaps in information production by means of open content and web logs present a new platform for civic participation. Whether and in what form such promises can be realized lies at the basis of the questions addressed in the projects [of the Working Group].[2]

Policy development

The forward-looking nature of policy development

The International Policy Fellowship (IPF) brief, focused as it is on new technology developments, requires a forward-looking approach to

[2] http://www.policy.hu/themes06/opinfo/index.html

policy analysis, one that would identify new opportunities for more open scholarly communication in future scenarios for Information and Communication Technologies (ICT) in higher education. In the case of my project, this involves examining policies for research dissemination and publication in South Africa, using South Africa – with its elaborated policy environment and middle economy status – as a test case for other, less well-resourced African countries.

At first sight this need for foresight would seem to coincide with the approach of African policy-makers. For example, the African Ministerial Council of Science and Technology (AMCOST), a 'high-level platform for developing policies and setting priorities on science, technology and innovation for African development' within the New Partnership for Africa's Development (NEPAD) and the African Union (AU), stresses the importance of forward-looking policies for African Science and Technology.[3] In its discussion document on science and technology indicators, NEPAD argues that policy-makers need to be able 'to discern, based on their expert knowledge, the future trajectories of the subject and the interventions which might improve its development' (NEPAD 2006).

Arie Rip, writing about South African R&D policy in a period of active policy development, has a more complex view, one which is helpful in analysing where South African research policy-making finds its strengths but also where it loses its way:

> The common mimetic route is to define the nature of capacity-building in terms of what is now seen as important. This may well be a recipe to become obsolete before one's time … [T]he world (of science and more generally) may well evolve in such a way that present-day exemplars will be left behind. So developing countries should set their sights on what is important in 2010, rather than what appears to be important now – however difficult this will be politically. (Rip 2000: 67)

Implicit in this view of policy formation is an act of imagination, albeit one founded in present knowledge. What has emerged from my study of South African R&D and research publication policy is a constant slippage between such forward-looking approaches – generally focused on the potential offered by developments in ICT in the knowledge economy – and 'the common mimetic route' described here by Rip, which applies current, 'traditional' models of research dissemination.

Contradictions in policy formulation

This slippage takes place between policies formulated by different government departments, and even within individual policy documents. In general, research and innovation policy formulated by

[3] http:www.nepadst.org

the South African Department of Science and Technology (DST) is more forward-looking (although there are some slippages within the policy documents), while the research publication policy of the Department of Education is firmly set in a traditional 'publish or perish' approach, with a strong emphasis on international publication in journals listed in the Thomson Scientific indexes.

Another common pattern that I have identified in government policy documents is a tendency to frame forward-looking ideas in the statements of intent, but then to suffer a failure of imagination and slip back to more familiar terrain when it comes to formulating implementation plans and – even more markedly – when performance indicators are in question. The general pattern, which draws upon theories of the information society and the knowledge economy, is that these forward-looking policy statements link ICT and development goals, identifying the potential of new technologies to contribute to the delivery of democracy, economic growth, employment, health and food production and social development. In this formulation, the role of the university is a public interest one and, implicitly, one would expect evaluation criteria to focus – at least in part – on the effectiveness of the development impact achieved by the research in question.[4] On the other hand, when the policy documents lapse back into the more familiar territory of Rip's 'present-day exemplars', they turn to proprietary models of intellectual property protection and commercial publishing models, underpinned by a market view of higher education. This means that patents and copyrights become the predominant measures for research success, rather than social and developmental impact.

In his study of neo-liberal education reforms in the Ugandan context, Obong provides a context for understanding these conflicting policy discourses. He identifies a shift from 'process control' to 'product control' in university management, linked to a parallel shift from collegial to corporate forms of governance. As a result, policy-makers and governments frame evaluation of the higher education sector in terms of measurable units of output, rather than seeking to match objectives with resources (Obong 2004: 119–20). Given the corporate ethos that lies behind these measures, they tend also to be conceptualised as market-linked outcomes.

Policy gaps

To someone coming to these policies from a publishing perspective, as I do, there are some striking gaps and illogicalities in the way that research dissemination is treated. There is an unproblematised assumption that the main, if not the only, publication output from

[4] Measurement of social impact is dealt with in the Australian Productivity Commission investigation is described in Chapter 4.

research conducted in South African universities should consist of journal articles, preferably internationally indexed journals. There is no recognition that this is not a medium that lends itself to ensuring the impact of research on development goals and none at all of the 'journals crisis' – the extreme escalation of journal subscription rates over the last decade, which is straining library budgets in the North and is fast putting journals out of the reach of the developing world (Willinsky 2006: 99–100; Chan & Costa 2005: 181). And so, while R&D policy is concerned with national development targets, research *publication* policy focuses almost exclusively on the status of institutions and scholars in the international rankings, failing to match national R&D policy with either the dissemination infrastructure or the resources that would be needed to deliver its goals.

It is striking that R&D policy is largely silent on the need for effective research dissemination and publication. There is, on the other hand, an increasing focus internationally on the importance of access to research – and hence of research dissemination – as a driver of social and development goals (Wellcome Trust 2003, 2004; EU 2006; Houghton, Steele & Sheehan 2006), the argument being that if access to research results is restricted, this has a negative impact on social welfare and economic performance. As yet, however, this kind of thinking is not filtering through into African research policies.

Moreover, there is no sense at national or institutional level that the higher education sector needs to take responsibility for the dissemination of research results. The presumption appears to be that scholarly publishing is a commercially viable business that will fund itself, or that someone else – 'do-gooder' philanthropic institutions perhaps, or 'greedy capitalists' – will pay for the production of scholarly publications – what Joseph J Esposito calls the 'free rider syndrome' (Esposito 2006: 192). Even in the case of South Africa, which has the best-resourced publishing industry in Africa, there is a very wide gap between the capacity of scholarly publishers and the level of research dissemination needed if the developmental goals of national research policy are to be taken seriously. What has to be recognised is that very little publishing of research is likely to be commercially viable; and that commercial viability as a principle should not provide a barrier to dissemination.

One of the first objections that is commonly raised in reaction to the idea of Open Access publishing is the question of sustainability. The idea that sustainability is the major impediment to Open Access is an insidious view and one to which I – and my funders – fell victim in the original formulation of this research project. Presumably in response to this, the Open Society Institute (OSI) guidelines for the Open Information track of their fellowship programme stressed the importance of researching sustainability models for Open Access scholarly publishing. My own research proposal aimed, in turn, at

researching sustainability models for open African research publication. It became evident very early on that this was a false trail. African scholarly publishing is not sustainable, and is unlikely ever to be, but this is not the real problem. The problem is a failure to recognise the importance of dissemination to the university's central mission. While universities will fund teaching, learning and research, there is a failure to recognise that research *dissemination* is, like all of these functions, an essential part of the mission of higher education and should be supported just as are the other roles of the university.

As we have already seen, the two outputs commonly recognised as measures for effective research impact are patents and copyrights. Patent registration is a very expensive process, and is funded by universities themselves. It is telling to note that the accepted view in university finance is that investment in registering patents is worthwhile – in expectation of one or two successful patents that would bring in substantial earnings to amortise this investment. And so large sums of money are spent in this way, without the acknowledgement that the figures show that there are no such gains and that that, at universities, patent registration fees are sunk costs. While investment in publishing costs would be considerably lower, there is a general acceptance in university management any publishing ventures must 'break even', do not need investment, and in any case are not really the responsibility of the institution.[5]

Because of these received opinions, there is a generalised failure to engage with the role that research dissemination could and should play in ensuring that policy goals are met. This is not exclusive to South Africa: as a recent Australian government study observes: '[D]espite billions of dollars being spent by governments on R&D every year, relatively little policy attention has yet been paid to the dissemination of the results of that research through scientific and scholarly publishing' (Houghton, Steele & Sheehan 2006: 1).

One result of the failure of research policy to pay close attention to the question of dissemination is the number of unexamined assumptions underpinning policy provisions, and the unquestioned acceptance of 'traditions' that are not traditions at all. And so the idea that proprietary models of IP – the registration of patents and strong protection of copyright – will contribute to national development goes largely unchallenged in South African – and most African – policy, in spite of mounting evidence to the contrary.

[5] One notable exception to this rule is the (South African) HSRC Press, which is supported by its institution and has instituted a very successful publishing programme which has, in turn, brought substantial benefits to the research council in the form of a demonstrable development impact of HSRC research, improved relationships with government, and an enhanced capacity for attracting contract research. This case study is described in Chapter 4 of this report.

There is extensive debate and controversy internationally about the consequences of strong IP protection for developing countries, and the potential, on the other hand, of peer production and collaborative development models (Lessig 2002, 2004; Litman 2001; Boyle 2003; Benkler 2006; Copy South 2006). This view is steadily moving into the mainstream, with a number of governments and international organisations beginning to pay policy attention to the need for more open access to research knowledge[6]. There are signs that the ball is rolling in mainstream scholarly organisations such as the African Academies of Science and the African branches of the Committee on Data for Science and Technology (CODATA[7]), but this debate has yet to reach the mainstream of African policy development.

The knowledge divide and African research dissemination

Access to the knowledge generated by African research is of vital importance in a continent with development needs so urgent that the effective dissemination of this knowledge can quite literally be a matter of life and death. African governments face overwhelming challenges: of providing food in the face of famine, and health services in the face of the HIV/Aids pandemic; of creating employment in a continent of mass unemployment, and of driving economic growth in some of the least developed countries on the globe. The question of access to appropriate and relevant knowledge resources should therefore be of burning importance.

In confronting this challenge, African universities (with the exception of those in South Africa – a country which faces its own post-apartheid challenges) find themselves handicapped by decades of structural adjustment programmes, starved of resources, struggling to retain staff and scarcely able to carry out research, let alone publish or disseminate it. The university system across sub-Saharan Africa (including South Africa) simply does not generate publications or disseminate research findings effectively enough to reach the audiences that need to make use of development-focused research from within the continent.

In this context, arguments are readily advanced that Africa cannot afford research publication. When access to research knowledge in Africa is on the agenda, the most common development approaches focus on ways of making publications from the large information-producers of the North available in Africa free of charge, or at differential prices. (CIPR 2002, UNESCO 2005) Laudable though this might be, it is simply a panacea that does not address the question of the production and growth of research output from *African* universities.

[6] For example, the UK House of Commons Science and Technology 10th Report; the FRPPA Bill in the USA and the EU Communication on scientific information in the digital age.
[7] http://www.codata.org/taskgroups/TGsadc/index.html

In fact, it could be argued that the availability of large volumes of free or discounted international content might even inhibit the output of local publications. In other words, this is, at best, only half of the solution.

The reality is that African research knowledge is either locked inside international publications that are too expensive for African university libraries and scholars, or is published in local journals that are relegated to the second-rank by a global system that does not value them, and that thus struggle to disseminate their publications effectively beyond a handful of subscribers. Largely as a result of this marginalisation, these journals often suffer from perceived or actual shortfalls in quality – it is a negative feedback cycle.

The policy environment thus fails to recognise the ways in which African knowledge is marginalised in and through the systems, policies and hierarchies that govern the global research publication system. In other words, in the system to which it subscribes as its main focus of research publication policy, Africa barely features. Worse still, this appears to be ignoring the knowledge that is produced from Africa, and its value – which is considerable.

What is needed is a virtuous cycle that uses effective dissemination to raise the profile of African research, to demonstrate its effectiveness in addressing national development goals, and, at the same time, through attracting government and donor support to improve its international recognition.

A new interest in African research

The question of policy relating to both the dissemination of research knowledge and access to it takes on a new urgency because policy development for African research has, after decades of neglect, now moved to centre stage in global policy. The World Bank has changed its focus and has now identified higher education as a key driver for African economic growth and poverty eradication (Bloom, Canning & Chan 2005). It appears that substantial funding will be released to restore an African higher education sector damaged by decades of emphasis on primary education and the consequent marginalisation of higher education. NEPAD, too, is calling for input from African universities in the creation of an African Science and Innovation Facility for the funding of research initiatives across the continent[8]. It is likely, then, that higher education policy development in African countries will soon enter a boom period, and it will be vitally important to ensure that publication policy is not neglected in the process – the new initiatives will need to address the knowledge divide rather than deepen it.

[8] http://www.nepadst.org

In this context, and given my research mandate, there is a strong advocacy approach in my research. In reviewing current policy for the dissemination of African research, and in making recommendations for future policy development, my aim is to propose policy interventions and practices that could ensure the most effective distribution and the maximum impact for African research knowledge, using open publishing models. South African research policy and practice, which is relatively highly elaborated, will act as a case study of successes and failures in this regard. This case study should then provide lessons for a number of African countries and universities contemplating research policy development in response to the greater emphasis now being placed on higher education in Africa by the African Union and NEPAD, as well as by national governments.

My paper addresses this neglected policy field in relation to social science publication in South Africa, evaluating these findings against with the broader field of African research dissemination policy and practice. The reasons for the focus on the social sciences are twofold. As is often stated in South African policy documents, the social sciences are of vital importance: for delivering the social renewal needed in South Africa, for the growth of democracy, the protection of human rights, and the monitoring of good governance – to name but a few. From a publishing perspective, the social sciences provide a window into the broader research environment, mediating what are often very technical findings into socially relevant language and recommendations. Secondly, the social sciences and the humanities are the disciplines most adversely affected by the traditional international scholarly publication systems and rankings. And yet it is here that a good deal of the most locally-relevant African research is produced.

This paper pays particular attention to the potential for new technologies and new publishing models to produce a research publication environment that might have a real impact on development. It seeks also to identify ways of using technology to help reverse the marginalisation of African research publication within the global community.

Because of the importance of new technologies and new modes of knowledge production, my paper begins with an overview of the changing global context for research dissemination. The first chapter explores the changes being wrought not only in research publication but also in the way research is being carried out. Drawing on theories of the information society in a networked world (Castells 2000; Gibbons 1998; Kraak 2000; Cloete et al. 2004; Zeleza & Olukoshi 2004; UNESCO 2005) – as it is articulated in South African research policy – and on Yochai Benkler's identification of the radical challenges being posed to

traditional modes of production by the networked information economy (2006), this chapter explores the challenges and opportunities posed for African research policy. It ends by charting the shift of emphasis from knowledge production as an end in itself to the ways in which a more recent focus on access to and participation in research knowledge is an essential part of research publication policy.

The second chapter – the core of the paper – reviews research and research publication policy in Africa against this background. The prime focus is a detailed study of South African policy, given that South Africa has become something of a policy factory in its post-apartheid development and has a highly elaborated research policy framework. This analysis maps the contradictions within and between the different policy documents. In particular, a major clash of paradigms emerges between development-focused research and innovation policies and a 'publish or perish' research publication reward system. The paper reviews the impact that this has on research priorities and institutional practice, and goes on to measure the damage done to African research by its marginalisation in the increasingly dysfunctional global research publication system to which such policy adheres.

In the third chapter I review the potential offered by digital media and new publication models to overcome the global knowledge divide, identifying the different models of Open Access publication and evaluating their potential in the African context.

The paper ends with recommendations for policy review at a national and institutional level. It explores what policy interventions might be needed at international, national and institutional level if African research is to leap the technology gap and take African countries into the twenty-first century, building their strength across the African continent and in the global scholarly community.

CHAPTER TWO: RESEARCH PUBLICATION IN A NETWORKED WORLD – AN AFRICAN PERSPECTIVE

Leaping the technology divide

At the iCommons Summit in Rio in June 2006, Brazilian Minister of Culture Gilberto Gil gave delegates a lyrical account of his world view, as well as – unusually for a Cabinet Minister – singing a few choruses for his audience. He challenged developing nations to embrace their own 'tropicalisms' and to use the latest technologies to make their voices heard globally, projecting their own knowledge and culture into the global arena.

The challenge that Gil and other South American speakers at the conference threw down was for developing countries to make the leap from the nineteenth to the twenty-first century, bringing together their own traditions of knowledge and culture and the potential offered by new technologies and new ways of working. The scale of this challenge cannot be underestimated, yet Gil is right from a policy perspective in recognising the leap that needs to be made, given that policy formulation must respond to twenty-first century needs, rather than merely working from twentieth century scenarios (Rip 2000; NEPAD 2006).

In a world in which the use of Information and Communication Technologies (ICTs) is radically altering modes of knowledge dissemination, and in which scholarly publishing looks to be thoroughly shaken up, there is a paradoxical advantage in the marginalisation of African scholarly publishing. In a rapidly-changing environment, where new technologies and new approaches to the conduct of research and its dissemination are swiftly taking hold, the fact that Africa has such a limited investment in the traditional print-based scholarly publication system frees policy-makers to engage with new trends in ways that their more privileged counterparts may be constrained from doing.

The recent lobbying efforts of the large journal publishers against Open Access policy initiatives in the USA, the UK and Europe are evidence of the conservative power of entrenched commercial interests. The vested interests that are at stake are substantial: for example the EU *Communication*[9] in its proposed policy for access to

[9] http://ec.europa.eu/information_society/activities/digital_libraries/doc/scientific_information/communication_en.pdf (accessed March 2007).

publicly funded research estimates that, of the 2000 scientific publishing houses globally, nearly 800 – which is 40 per cent of the total – are based in Europe, publishing close to 50 per cent of research articles worldwide. These scientific publishers employ 36 000 people in the EU, as well as 10 000 freelancers (see also Poynder 2007). This is a constituency that cannot be ignored by governments in those countries with substantial scientific publishing industries, as it creates a backward drag on efforts to introduce policies for new and more open modes of research dissemination.

In Africa, where the current journal system manifestly does not work for the effective dissemination of African research knowledge, there is an opportunity for policy makers to explore new and different ways of using the increased potential offered by digital media, by using *interactive* forms to disseminate research knowledge and reach a variety of audiences. Given the limited reach of African journals in the current system, the potential for Africa to leapfrog technological gaps is therefore a real one – in fact this might be an imperative rather than an option. In these circumstances, there is an obvious advantage in the increased and uninhibited reach of Open Access electronic delivery and it is interesting to note that in South Africa there is already a high percentage of journals (about 70%) that offer electronic access (Gevers & Mati 2006: 75).

A major inhibiting factor could, however, be the need for an adequate ICT infrastructure to support a twenty-first century research dissemination system in Africa. However, in our globally networked society, the need to address this question is being recognised as an incontestable priority, and African connectivity and ICT infrastructure is improving, if unevenly, across the continent at a very rapid rate.[10] It is also being recognised in a number of international forums that Africa cannot wait for adequate infrastructure before beginning the transformation of its research communications systems; it has to plan now for the implementation of more forward-looking policies and practices.

So what then could be the future profile of knowledge dissemination that policy-makers would need to discern? It is a long way from the commercially-driven, private-ownership and globally divisive publishing system currently in place as the arbiter of scholarly rankings. Critically, African higher education institutions will need to move beyond the current focus on production, rather than dissemination, to ask in what ways they can rethink publication as public knowledge, using dissemination and accessibility as the tests.

[10] A number of papers on this topic are available online in the Frontiers of Knowledge forum website.

Research dissemination in a network society

If one looks at the international context in which this study is contextualised, it is clear that traditionally accepted systems for the dissemination of research knowledge are being vigorously challenged, largely – but not only – as a result of the technological revolution wrought by the advent of the Internet and the growth of a knowledge economy in a globalised network society. In this environment, Africa risks being further marginalised, as 'technological capacity, technological infrastructure, access to knowledge, and highly skilled human resources become critical sources of competitiveness in the new international division of labour' (Castells 2000: 109). And yet these very technologies could offer a way out of the knowledge divide, provided that the necessary ICT capacity is put in place. Web technologies offer a communicative infrastructure that could bridge national boundaries at very little marginal cost, and reduce the current isolation of African research, providing the tools for collaborative research and teaching development that could help overcome the lack of capacity that currently undermines African research efforts.

This was recognised by the South African policy-makers at an early stage of policy formulation for science and technology research. The 1996 White Paper on Science and Technology (DACST 1996) identifies as a primary challenge 'the knowledge-based transformation of many of the world's societies as a result of the increased flow of information made possible by ever-improving global communications technologies'. The document stresses the 'ability to maximise the use of information' as the 'single most important factor in deciding the competitiveness of countries as well as their ability to empower their citizens through enhanced access to information.'

The advent of new information technologies has, in the last decade, brought about profound changes not only in the dissemination of research knowledge but also in the way research is being conducted and in the potential for research to impact positively on social and economic development. In general, when it comes to research dissemination policy, there is a growing shift from a focus on international prestige and the ranking of research institutions and individuals to an emphasis on the value of broader access to research knowledge. In addition, there is new thinking about the real value of non-proprietorial knowledge production and dissemination; open access and collaborative development is favoured, rather than the accumulation of patents and copyrights geared towards commercial returns.

As Yochai Benkler puts it at the start of his seminal new book, *The Wealth of Networks:*

> The change wrought by networked information economy is deep. It is structural. It goes to the very foundations of how

> liberal markets and liberal democracies have coevolved for almost two centuries. A series of changes in the technologies, economic organisation and social practices of production in this environment has created new opportunities for how we make and exchange information, knowledge and culture. These changes have increased the role of non-market and non-proprietary production, both by individuals alone and by cooperative efforts in a wide range of loosely or tightly woven collaborations. (Benkler 2006: 1–2)

New technologies are thus affecting not only knowledge dissemination strategies but also the very basis of our commonly-accepted paradigms of social and economic systems and behaviours. This could provide challenges for African development policies, but could also generate real opportunities for breaking the cycle of dependency and dysfunction, using such collaborative and non-proprietary approaches as Benkler describes. Given the collaborative, lateral systems and networked social structures that characterised many pre-colonial sub-Saharan societies, this would, I believe, be closer to traditional African ways of social organisation and cultural production (Crais 2002; Gray 2006; Copy South 2006). In fact Africa should be able to lead the way in understanding the knowledge revolution which must soon be accepted as unstoppable.

The impact of strong intellectual property regimes on the developing world

The above-mentioned potential for the 'knowledge-based transformation … made possible by ever-improving global communications technologies' identified by South African policy-makers is, however, challenged by an opposing trend in IP law and policy. Under pressure from the large global media conglomerates, IP law in the United States and, to an extent, in Europe, is becoming increasingly restrictive. The signs are numerous: the extension of the term of copyright; the enforcement of technological protection measures in the Digital Millennium Copyright Act (DMCA); and the aggressive drive towards enforcement with its rhetoric of 'piracy' that has seen teenagers sued for music sharing. These measures demonstrate a tendency towards increased enclosure and monopoly in the global IP systems. Power in this environment accrues to those with the financial muscle to enforce the rights they claim and, increasingly, international trade agreements are being used to force these restrictive practices onto the USA's trading partners. (Copy South 2006; Consumers International 2006)

This tendency towards increased copyright is increasingly being challenged as both unsuitable to and unfavourable to the developing world. The Copy/South Dossier argues that the 'dominant discourse around intellectual property – whether legal or sociological – starts from some largely unexamined assumptions' (Copy South 2006: 12). These assumptions include the effectiveness of the copyright system for encouraging creative endeavour and the applicability of the regime in every world context. The result, this report argues, in line with a number of developing world commentators, is to concentrate ownership and control of the world's cultural production in the hands of a small group of private owners, to the detriment of the global South (Copy South 2006; Consumers International 2006; Boyle 1997; Boyle 2004; Willinsky 2006).

In his discussion of the developing world in a network society, Benkler makes some very telling observations in relation to the conduct and dissemination of research, a commentary that poses a radical challenge to conventional ways of thinking about how to achieve real research impact in alleviating development problems. The mainstream global approach to managing knowledge transfer – being driven mainly by the USA – is to enforce ever more protective IP regimes. Benkler argues, as do a growing number of commentators (Lessig 2002, 2004; Boyle 2003; Copy South 2006; Liang, Mazmdar & Suresh 2005), that these IP regimes are particularly harmful to the net importers of information in the developing world. Patents and copyrights are designed to work for private enterprise in the highly developed economies of the North, and not for developing countries. The incentives provided by the IP system, Benkler argues, result in higher prices for products developed only for the major markets of the rich countries:

> Under these conditions, the above-marginal-cost prices paid in these poorer countries are purely regressive redistribution. The information, knowledge, and information-embedded goods paid for would have been developed in expectation of rich world rents alone. The prospects of rents from poorer countries do not affect their development. They do not affect either the rate or the direction of research and development. They simply place some of the rents that pay for technology development in the rich countries on consumers in poor and middle-income countries. The morality of this redistribution from the world's poor to the world's rich has never been confronted or defended in the European or American public spheres. It simply goes unnoticed. (Benkler 2006: 318)

The system is too deeply entrenched, Benkler suggests, among the dominant global IP producers for there to be much chance of reversing

the current trend towards more protectionist IP regimes: 'Because the international trade and intellectual property system is highly "playable" and manipulable … systematic resistance to the expansion of intellectual property laws is difficult' (320). Or, put more cynically: 'Monopoly is a good thing to have if you can get it' (319). Rather, alternative approaches need to be found that might free up the dissemination of developing-world knowledge.

The extent to which the patent and copyright systems disadvantage developing countries are demonstrated in the geographical spread of patents and other indicators, such as journal citation indexes. In 1999, in the United States patent system, North America filed just over 51 per cent of the global total of patents, the industrialised countries of Asia another 28 per cent, and Europe almost 19 per cent. The rest of the world thus accounted for only 1½ per cent of patents filed in the USA. When it comes to the Science Citation indexes, in 2000, Africa's share came to 1 per cent, a fall of 15 per cent through the 1990s (UNESCO 2005: 115–6)[11]. UNESCO comments in its report *Towards Knowledge Societies* that 'Intellectual property remains overwhelmingly in the hands of the countries of three regional or subregional groups representing only a quarter of the world's population' (116).

The commercialisation of higher education research

Given the very skewed nature of the global IP system, there are strong arguments for developing countries to consider alternatives to the commercialisation of knowledge that results from the idea that the exchange of knowledge forms part of a money-based *economy.*

In South African research policy, this has expressed itself by an insistence on the registration of patents and publication of articles in indexed journals as the measures for research effectiveness. While UNESCO in its report on knowledge societies argues for a continued focus on the registration of patents as a central part of the public research regime in developing countries (UNESCO 2005), Benkler's thinking might be closer to the realities that face developing countries. At the very least, I would argue that African research and innovation needs to problematise the idea that innovation necessarily means *commercial* output. In fact, I would argue that this line of thinking entrenches a backward-looking endorsement of the knowledge economy as a site of trade and underplays the collaborative, peer production potential offered by digital media in a networked world.

The chase for patents is an expensive process that depends on heavy investment and on the muscle to enforce proprietary rights. Just as with copyrighted journals, it dominates policies for African R&D

[11] It should be noted that this fall in the relative numbers of African citations was in large part due to a surely-shortsighted foreign disinvestment in African university research during the 1990s.

outputs and is unlikely to produce results that are helpful to developing countries. The research priorities that dominate in a strong IP regime, based as it is on commercial returns generated from 'locked-up' knowledge, are unlikely to address the urgent and immediate development needs in poor countries. To make matters worse, the patent process requires that research findings be kept confidential prior to and during the application process, which can result in long delays in releasing what might be vitally important research information.

There are also distortions in research priorities implicit in the chase for profit from university research. A 'strong' IP system in an unequal global environment creates a world in which – for example – research on acne, which affects about 20 million American teenagers, would be more likely to attract investment than research on sleeping sickness, which affects 66 million Africans, and kills about fifty thousand every year (Benkler 2006: 345).

On an academic, as well as an economic, level, Benkler argues that the move towards greater exclusive rights, particularly patents, will not lead to development outcomes: 'A sector based on expectation of sales of products will not focus its research where human welfare will be most enhanced' (Benkler 2006: 336). It would appear therefore that a more effective model for developing nations would be the leverage of the research undertaken by second economy nations such as China, India and Brazil in collaborative peer production models. As the Australian Productivity Commission (2007) puts it, to narrow a focus on commercialised outputs can potentially limit the development impact of research:

> Ultimately, in terms of community wellbeing, it is the transfer, diffusion and utilisation of knowledge and technology that matters. The social return from public investment in R&D depends on: whether knowledge and technology are transferred out of universities (that is, whether they see the light of day); how fast and widely the knowledge diffuses among potential users; whether the knowledge and technology is developed into some form of practical application (that is, whether it is taken up in some form or other that is welfare enhancing); and how widely the resulting innovation is utilised. There are multiple pathways for achieving these benefits. (Productivity Commission 2007: 280)

This kind of thinking is in line with a growing resistance to the USA's push for the increasing enclosure of research knowledge, in legislation such as the DMCA. The Wellcome Trust, one of the funding agencies that recently adopted a policy of mandating open access to the

research that it funds, expresses the values that underpin such initiatives thus:

> Public and merit goods are those which the public values but which the markets find it difficult to allocate because individuals cannot, or should not, be excluded from their consumption. Scientific research falls into this category and society as a whole is worse off if access to scientific results is restricted … The benefits of research are derived principally from access to research results. To the extent that the dissemination of research results is less than might be from given resources, we can argue that the welfare of society is sub-optimal. (Wellcome Trust 2004: 6)

It is important, therefore, that African countries resist the pressure towards ever-strengthening IP regimes and explore instead the extent to which the benefits of collaborative research development could counterbalance an excessively and unrealistically commercialised innovation policy framework. The role of patents and copyrights in a market-driven view of higher education research impact would then need to be interrogated with a clear-sighted evaluation of those cases in which this approach might be effective and where it is simply an outmoded and counter-productive insistence on quantitative measures.

Access and participation

What the networked world therefore provides is the possibility of freer, collaborative and horizontal models for the exploitation of knowledge. Electronic publication offers unbounded dissemination, transcending the geographical boundaries that limit distribution of African research in print form, and affords new opportunities for the open dissemination of research information. While the costs of authorship and document preparation (design and typesetting) remain, the major investment of printing and physical distribution of print products falls away. Electronic publication does require the availability of hardware and bandwidth. In the case of South Africa, the universities do have access to an adequate ICT infrastructure, and across Africa, the situation is rapidly improving. Bearing in mind that policy must be forward-looking, it has to be accepted that, as the delegates at the November 2006 Frontiers of Knowledge Forum (Frontiers, 2006) endorsed, the provision of this infrastructure is a vital necessity, not a luxury. As John Gage argued at this conference, providing fibre-access to African universities would not – in terms of international aid budgets – be prohibitively expensive. (This is discussed in greater detail in Chapter 4.) Software is available through open access sources and should therefore not constitute any problem.

In opposition to the excessive commercialisation of the journal business, and in reaction to attempts to impose an increasingly

oppressive IP regime on digital products – particularly in the US – the Open Access movement has turned attention to the question of *access* to research knowledge, while traditional publish-or-perish policies focus on its *production*.

There is a growing acceptance across the world, manifested in a number of international declarations[12], that research is a public good and that there should be public access to publicly-funded research. One of the original statements of this principle, the Budapest Initiative, formulated by the Open Society Institute, puts it cogently:

> An old tradition and a new technology have converged to make possible an unprecedented public good. The old tradition is the willingness of scientists and scholars to publish the fruits of their research in scholarly journals without payment, for the sake of inquiry and knowledge. The new technology is the Internet. The public good they make possible is the world-wide electronic distribution of the peer-reviewed journal literature and completely free and unrestricted access to it by all scientists, scholars, teachers, students, and other curious minds. Removing access barriers to this literature will accelerate research, enrich education, share the learning of the rich with the poor and the poor with the rich, make this literature as useful as it can be, and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge (Soros Foundation 2002).

More than thirty nations (including South Africa) have signed the OECD[13] Declaration on Access to Research Data from Public Funding (OECD 2004), and an increasing number of governments, public institutions and donors have developed policies that advocate public access to the research that they support and fund.. The European Union in a recent report recommended 'guaranteed public access to publicly funded research shortly after publication' and also recommends a role for government and research bodies in ensuring 'a level playing field' in terms of business models for publication, promoting electronic publication and finding support for publications that might not be economically viable (EU 2006: 88–9). This has stimulated intense debate, with the publishing industry lobbying the

[12] A summary of, and access to the text of, these initiatives is provided on the website of the iCommons Rio Framework for Open Science, http://wiki.icommons.org/index.php/The_Rio_Framework_for_Open_Science.

The most comprehensive discussion of the Open Access movement, including the various declarations and initiatives, and the history of the commitment of governments and institutions to the principle of Open Access, is on Peter Suber's Open Access Newsletter website: http://www.earlham.edu/~peters/fos/overview.htm.

[13] Organisation for Economic Co-operation and Development

EU, and academic institutions submitting a petition in support of free access.

A number of research agencies are now asking for open archiving of the research they fund. The National Institute of Health in the USA requests Open Access archiving of the research it supports; the UK Research Councils ask that funded researchers deposit a copy of their research in an archive, and the Australian government has just commissioned a report on the need for Open Access research dissemination and its potential financial impact. This report, discussed in greater detail in Chapter 4, makes far-reaching proposals for a radical overhaul of traditional research publication policy (Productivity Commission 2007. See also: DEST 2006; Allen Consulting 2005). This report argues for a more balanced view of the potential for commercialisation through patents and copyrights, for a focus on national rather than international impact, and for performance evaluation based on a broader range of social, economic and environmental impacts. Finally, the report makes detailed and wide-ranging recommendations for Open Access dissemination of research information, emphasising the academic, social and economic benefits that this would bring to the country (Productivity Commission 2007: 227–248). Given that the development of education policy in South Africa has been heavily influenced by Australian thinking, this report is worth noting in some detail.

In the next section of this paper the development of South African research policy is reviewed against the background of these debates. In particular, the question is posed as to whether this policy formulation meets the requirement of being forward-looking in relation to likely technological developments. The paper goes on to outline the development of Open Access research publication models and evaluate the potential of these approaches in lowering barriers to effective African research publication.

CHAPTER THREE: RESEARCH PUBLICATION POLICY IN SOUTH AFRICA

The policy gap: research publication in sub-Saharan Africa

Until the recent upsurge of interest triggered by new technologies, research publication has not been subjected to much scrutiny. The publish-or-perish world of journal rankings and citation indices has all too often been taken as a given, an unquestioned good. And although new modes of research dissemination have now become the subject of lively debate worldwide and the object of a wide range of policy initiatives[14], scholarly publishing as a topic for discussion and re-evaluation seems to have remained below the policy radar in most of Africa (and in many other developing countries). This is perhaps strange, given that the research and innovation policy initiatives being undertaken in Africa are clearly influenced by theories of the knowledge economy and the network society (Benkler 2006, Castells 2000; Gibbons 1998; Kraak 2000; Cloete et al. 2004; Zeleza & Olukoshi 2004), and it would seem obvious that knowledge dissemination should be a critical component of development-focused African R&D policy.

Universities are expensive investments and, with an increasing focus on higher education as a driver for development growth (Bloom, Canning & Chan 2005), governments across Africa are seeking ways of increasing the impact of university research and asking how they can best leverage research knowledge for national advantage (Hall 2005). In South Africa, for example, the Department of Science and Technology (DST) recorded investment in research in universities in 2003 at R2.5 billion ($320 million at current[15] exchange rates) of which R1.6 billion ($205 million) – i.e. nearly two-thirds – came from government funding[16]. The humanities and social sciences accounted for 12.4 per cent of this R&D expenditure, interestingly not far off the proportion of university R&D spent on medicine and health, at 14.8 per cent (DST 2006: 25). In these circumstances, where there is substantial government expenditure, the importance of research dissemination is heightened: unless research findings are released into the community,

[14] The best overview of this debate is Peter Suber's Open Access Newsletter: http://www.earlham.edu/~peters/fos/fosblog.html
[15] Mid-2007.
[16] These figures are understated for the HE sector as a whole, as they exclude the Science Councils, which are regarded as part of the government research sector in terms of the DST analysis of expenditure.

to feed into social and economic upliftment, national investment can be regarded as having been wasted.

African universities face a dilemma in this regard. On the one hand, they have a strongly articulated public role, with a responsibility towards delivering developmental targets. On the other, they are subjected to the demands made by an increasingly market-driven approach to running institutions. At the 2006 Frontiers of Knowledge forum of African vice-chancellors in Cape Town, a number of vice-chancellors recounted with pride the entrepreneurial strategies their universities had deployed to generate revenue, in order to survive inadequate funding from cash-strapped governments.

Dick Kawooya, a fellow researcher in the IPF Open Information Working Group, addresses this dilemma in relation to the draft intellectual property policy being drawn up by the University of Makerere, which acknowledges lack of research funding as a major challenge (Kawooya 2007). He points out that the policy explicitly identifies research findings as intellectual assets which need to be protected, and perceives them as an economic resource that can be worked for the public good. Criticising current university 'management' strategy, Kawooya says: 'This utilitarian approach to IP comes as no surprise in an environment where economic interests trump the public good and academic institutions are increasingly taking on corporate cultures and practices' (Kawooya 2007: 31–2).

A result of this market-focused approach is that the discourse dominating innovation policy has tended to be instrumentalist. This has resulted in a primary focus on research–industry collaboration, reflected, for example, in NEPAD's proposals for the development of industry-based indicators for research output (NEPAD 2005). In South Africa – the African country with probably the most elaborated higher-education policy framework – there is a good deal of discussion in policy documents of new modes of knowledge *production*, but the matter of knowledge *dissemination* is either totally absent, or is described as knowledge transfer through industry–university collaboration. Communication is seen as dialogue on research in progress between university and industry partners, with any permanent record of research outcomes being (only) in the form of journal articles. Publications are treated as a set of easily-measured counts in accredited journals, often with equally mechanical criteria for evaluating the 'quality' of these publications: instead of considering the level of scholarly contribution made in a journal article, evaluation is based on measures such as regularity of publication, the existence of an editorial board, etc. (Gevers and Mati 2006).

The current system of scholarly publication seems to be treated by policy-makers (and indeed by many academics) as an unchallenged 'given', a kind of public good that does not need examination or interrogation. And so: journals are good, more journal articles are

better, foreign is better than local, current methods of peer review are an unchallengeable good, international journal rankings and citation indexes are the best measure of quality … and so on.

Most damagingly of all, the real outcome of this kind of research publication policy is, all too often, to block access to research data rather than opening it up. The emphasis on prestige leads to a drive towards publication in a system that devalues African research and can result in a distortion of local research priorities. It is clear that African scholars need to grapple with the failure of existing systems and the potential of new dissemination technologies and strategies if they are, as NEPAD asks, to be able to position themselves in the changing trajectories of twenty-first century communications. Right now, however, such thinking is very far indeed from the discourse that predominates in most African research publication policy.

Research policy development in South Africa

In common with its African neighbours, South African policy literature provides little analysis of the state and viability of current modes of research publication, of how publication could most effectively support the development goals articulated in research and innovation policy, or of how research publication could be structured and supported (with the honourable exception of the South African Academy of Science report discussed on page 25, below, and in Chapter 5). What little discussion there has been has tended to focus on how to make the existing system work, in order for academics to earn their research reward grants, rather than critically interrogating the effectiveness or appropriateness of the current environment.

After the collapse of apartheid, South Africa became something of a policy factory as it confronted the transformation challenges of reversing the apartheid legacy. Although its policy initiatives are on a larger scale than those of many other African countries, there are a number of similarities and common threads, in spite of a lesser reliance in South Africa on donor-funded policy-making or on policy initiatives driven by international agencies. Given its comprehensiveness, South African policy development for the higher education system from 1990[17] provides a useful framework around which to discuss higher education policy challenges across the continent. In some cases, South Africa articulates in formal national policy documents what is implicit or informal in other countries and thus provides a useful testing ground for the effectiveness and appropriateness of higher education policy in an African context.

[17] In February 1990, President de Klerk announced the start of negotiations for a democratic government.

Teboho Moja (2006) traces two distinct phases in higher educational policy development throughout Africa in the twentieth century. The first wave followed independence for many African countries in the 1960s and ’70s and focused largely on mechanisms for the expansion of higher education. In an intermediate period, World Bank policies diverted attention and funding to primary education and led to a neglect of higher education policy issues, and the decline of the higher education sector. In South Africa, meanwhile, apartheid ideology perverted the policy environment, fragmenting the sector along racial and ideological grounds. The second phase of policy development, which concerns us here, came in the wake of the collapse of apartheid, the establishment of the African Union and NEPAD. Influenced by globalisation concerns, these policy initiatives – in so far as they apply to research development – are aimed at ensuring that the higher education system falls in behind national initiatives for human resource development and national economic growth. Another current strand of policy development is concerned with re-establishing the international prestige of African universities in the canons of citation counts and impact criteria.

Higher Education policy in South Africa, as it has developed in the years of political transition, follows this pattern and shows a strong commitment to development goals, economic growth and poverty reduction (Bawa & Mouton 2002; Hall 2006). It is built predominantly around a discourse of national innovation and tends to favour science and technology research, although statements are made about the importance of the social sciences[18]. There are robust attempts to coordinate policy across the different government departments and institutions involved, and these coordinating factors are generally also framed by a desire to deliver development goals.

When it comes to research dissemination policy, however, the developmental discourse seems to fall apart. Although the development rhetoric is still there, in introductory comments in research publication policy documents (at least), provisions for the promotion, measurement and rewarding of research dissemination and publication revert to a much more conservative paradigm than the founding principles of the framing policy appear to demand.

The history of South African research policy development

The new South African research policy process started with a report on Science and Technology Policy in South Africa, commissioned by the democratic government from the IDRC[19] (van Ameringen 1995). This report set the pattern for the development of further policy

[18] The term ‘science’ as it is used in the policy documents is subject to considerable slippage, sometimes being consciously used as a generic term for all knowledge, but more often (though unacknowledged) referring to the ‘hard’ sciences.
[19] International Development Research Centre.

interventions by stressing the need for research policy to align with 'the real development needs of the majority' in a coordinated way. It emphasised the need to realign policy to foster the recognition that South Africa is an African country 'and that it has experiences and knowledge to share, but that it also has much to learn from other societies' (van Ameringen 1995). The recommendations from this report stress the need for coordination of higher education policy and for articulation with the needs of the country – in particular the need for consultation and communication with disadvantaged communities.

Once the initial policy recommendations were taken up for implementation by the South African government, higher education policy developed in two broad channels, one driven by the Department of Arts, Culture, Science and Technology (DACST)[20] and the other by the Department of Education (DoE) (Bawa & Mouton 2002). New structures were developed for research policy implementation, of which the most important for the purposes of this discussion is the National Research Foundation (NRF), mandated to align research funding to the developmental policy drivers agreed upon.

A White Paper on Science and Technology was published in 1996 (DACST 1996). Built around the concept of 'Innovation' and the need for this innovation to contribute to national growth, it picks up on the IDRC's recommendations for a development-focused, Afro-centric policy environment. It speaks of the need to address 'more effectively the needs and aspirations of its citizens … within the demands of global economic competitiveness'. From the outset, this White Paper identifies the need to align policy with changing global information communication technologies. An introductory comment reads: 'The world is in the throes of a revolution that will change forever the way we live, work, play, organise our societies and ultimately define ourselves … The ability to maximise the use of information is now considered to be the single most important factor in defining the competitiveness of countries as well as their ability to empower their citizens through enhanced access to information.' Later in the document, this approach to information is elaborated as a social contract:

> The development of a South African vision of the information society is urgently required, one serving our own needs rather than echoing those of other nations.
>
> A South African vision of the information society should seek to ensure that the advantages offered by the information revolution reach down to every level of society and achieve as best a balance between individuals and

[20] This department was later split into two: the Department of Science and Technology (DST) and the Department of Arts and Culture (DAC). It is the DST that continues to have the responsibility for research and innovation.

> social groups, communities and societies as is practically possible.

However, reading further in the context of the whole document, particularly when it comes to discussion of research dissemination, one begins to wonder if the global information revolution being spoken of here is not a matter of information technology minus the information that it is designed to transmit. In other words, the generally technocratic approach of the White Paper does not grapple with the need to transmit research information in order to achieve maximum impact. It is as if a pipeline is being designed and developed without provision for the water that should run through it.

Henry Jenkins makes an interesting reflection on this approach in his recent book, *Convergence Culture: Where old and new media collide.* 'Increasingly', he comments, 'the digital divide is giving way to concern about the participation gap. As long as the focus remains on access, reform remains focused on technologies; as soon as we start to talk about participation, the emphasis shifts to cultural protocols and practices' (Jenkins 2007: 23). A focus on participation, I would argue, would also bring about a greater emphasis on communicative competence and hence on content, in a variety of formats.

While the White Paper insists on the need for its policies to 'see the promotion of the effective distribution of available knowledge as a critical function of a national system of innovation', the document as a whole seems to conceive of research dissemination in terms of technology transfer within university–industry partnerships. There does not seem to be an understanding of the powerful role that publication and dissemination can play in widening access to research and increasing its impact. This is in spite of the fact that the importance of the humanities and the social sciences, which depend to a great extent on knowledge dissemination through publication, is identified as a vital component of the R&D Innovation programme. The humanities are granted four important roles:

- the understanding of social processes and problems;
- facilitating appropriate technological change within society and within the economy;
- providing the basis of policy analysis;
- a source of new knowledge and an informed critique of transformation.

As far as the social sciences are concerned, the White Paper stresses the need for new knowledge to consolidate democracy, the protection of human rights, and public accountability, and to advance policy research in health care, education and employment creation. The document talks of the need to 'identify and explain global trends and their implications in areas of political and economic life, communications and lifestyle changes'. There is nothing in the policy,

however, on how the transmission of such knowledge is to be supported.

The White Paper also acknowledges an increase in more collaborative approaches to knowledge development: 'Traditional ways of producing knowledge within single disciplines and institutions are being supplemented by knowledge generated within various applied contexts. This is knowledge that is collaboratively created within multidisciplinary and trans-disciplinary research programmes directed to specific problems identified within social and economic systems.'

However, when it comes to the dissemination of the information being generated and how this information would be leveraged to achieve social and economic impact, the White Paper is silent. Nor is there any discussion of the new and interactive modes of dissemination that might provide effective research communication in a collaborative research environment. This is in contrast to the recommendations made in the Australian Productivity Commission Report, which provides a detailed analysis of how research goals could best be reflected in dissemination policy and practice (Productivity Commission 2007).

When the recommendations of the White Paper were translated into strategy proposals by DACST in *South Africa's National Research and Development Strategy* (2002) this document expressed serious concern at the dominance of aging white men over research publications and the very low percentages of research output from black scientists and women. (DACST 2002, 54)

As far as IP is concerned, the strategy document articulates the need to address the challenges posed by new technologies, and the question of biotechnology and indigenous knowledge. 'International thinking on legislation is as fluid and fast-moving as the new technologies themselves', the report comments. 'We need to develop competencies as a matter of urgency or face exploitation and marginalisation with respect to our own resources. A clear approach to intellectual property that arises from publicly funded research is required' (2002: 22). However, the subsequent discussion of IP issues is far from clear, veering between recognition of the importance of public access (somewhat understated) and the 'appreciation of the value of intellectual property as an instrument of wealth creation in South Africa' (68). These contradictions are not resolved in the strategy document and indeed legislative reform and policy formation concerning copyright have been in suspension in South Africa for some time.

When it comes to proposals for managing the implementation of the Innovation Strategy in the NRF's Business Plan for 2006/7 and 2008/9, publication and research dissemination again have a very low profile. Dissemination and research outputs appear only as a matter of mechanical counts: number of reports, journal articles and other

publications, and patents registered. This appears to be more of a matter of recording performance than ensuring impact or transformative effect.

Research publication policy in South Africa

In South Africa it has been left to the Department of Education (DoE) – at least thus far – to articulate more detailed policy on research publication. From an early stage in the political transformation of the country, the DoE focused on the creation of an overarching policy initiative for higher education reform in the country: the formation of the National Commission on Higher Education (NCHE) in 1994, which framed the discussion that ultimately led to the White Paper on Higher Education (1997) and the National Plan on Higher Education (NPHE) (2001). The policy-making process was characterised by wide-ranging discussion and debate, with an emphasis on consultation and transparency. Here, again, the framing discourse was developmental and the key issues were equity, diversity, redress and the creation of research strength.

Preliminary remarks in the NPHE on research and research dissemination sound encouraging: a strategic objective is 'to promote the kinds of research and other knowledge outputs required to meet national development needs and which will enable the country to become competitive in a new global context' (NPHE 2001: 60). The document complains of a lack of coherent policy on research outputs, promising policy development to address this issue. It raises the need to respond to the global transformation of knowledge dissemination through ICTs, and talks of the need to build networks to fuel the growth of an innovation culture (61). The problems identified are those of declining research publication output and the dominance of ageing white researchers as authors of publications. Lastly, an interesting detail: the report comments on concerns raised about the lack of attention to certain types of publication, such as technical reports and policy reports.

As a publisher, if I were to turn these recommendations into publication policy, I would look for a research dissemination policy that addressed the real needs of a country in a state of radical transformation, that incorporated the potential offered by new methods of knowledge dissemination, that reflected the approaches spelled out in the Innovation Strategy and the NPHE, and that made provision for a range of publishing outputs to meet the needs of different audiences and constituencies. I would look for a focus on national, rather than international, dissemination in the first instance,

to ensure that research findings would have the required impact[21]. I would also look for funding mechanisms to support knowledge dissemination, and for policies for public access. Lastly, I would look for an awareness of the potential for new dissemination models based on the advantages offered by new communication technologies in delivering effective research dissemination in the service of radically increased development impact.

Instead, when the Department of Education delivered the promised policy on research dissemination in 2003, it only paid lip service, in its preliminary comments, to the need – articulated in the NPHE – 'to sustain current research strengths and to promote research and other outputs required to meet national development needs' (DoE 2003: 3). The policy document goes on to spell out a publish-or-perish reward system that recognises and rewards peer-reviewed publication in journals appearing in the Thomson Scientific and IBSS indexes, and a somewhat problematic list of locally-indexed journals, in part inherited from the apartheid era (Gevers & Mati 2006). This policy is unusual, compared with other countries, in that it pays a substantial subsidy to universities whose academic staff publish in these 'recognised' publications. Although peer-reviewed books and conference proceedings accepted by an evaluation panel are also rewarded, they have a lesser weighting in terms of financial rewards.

The wording of the policy insists on 'originality', rather than tackling the implications of the collaborative research approach recommended in the broader policy framework, and the target audience of these publications is identified as 'other specialists in the field'. It therefore rewards individual rather than collaborative effort, and focuses on dissemination within the scholarly community, rather than on the wider dissemination needed for delivering R&D and Innovation development goals. Moreover, the financial reward system at institutional level works in such a way as to disadvantage collaborative research – both interdisciplinary research between university departments, and collaboration between different institutions.

Although the DoE document starts by taking into consideration 'the changing modes of disseminating research and output, such as electronic publication' (DoE 2003: 4), the details of its provisions are clearly geared primarily to print publications. In other words, the policies which determine rewards for research publication remain firmly in a collegial tradition, in which the purpose of scholarly communication is turned inwards to the academy and is related to

[21] The experience of the HSRC Press, detailed in Chapter 4, suggests that this would not be incompatible with maintaining international prestige. There are also examples, such as the Australian recommendations discussed in Chapter 4, and by Chan and Costa (2005), that suggest ways of achieving publication in the high-ranking international journals while still maintaining a national focus.

personal advancement in the academic system. This is in contrast to a system that would recognise or reward the broader societal or developmental impact of research dissemination.

The impact on the institutions

The fact that the DoE pays generous subsidies to the universities primarily for the publication of journal articles in 'accredited' publications has a distorting effect on the research and publication patterns of academics and on the institutional policies of the universities. In an attempt to access the (generous) funding available for publication, universities are scrambling to put in place promotion and reward systems – to encourage a high output of journal articles from their academic staff – with a standard requirement being the publication by each academic of two journal articles a year in recognised publications. There is also a very limited range of publications that qualify for subsidy: the strong preference is for journal articles, but books, chapters in books and refereed conference proceedings also qualify, albeit for a lesser subsidy.[22]

Some universities are introducing punitive measures which would penalise academic staff who fail to deliver these targets, through withholding academic promotions, and part or all of salary increases, if there is a failure to publish. This is in stark contrast to the UNESCO warning that countries should not treat index scores as rigid reference points, rather than 'concentrating on the actual problems of the fields studied' (UNESCO 2005: 161). Even more, it runs counter to the bemused statement of the creator of the Science Citation Index that 'I expected it to be used constructively while recognising that in the wrong hands it might be abused … we never predicted that people would turn this into an evaluation tool for giving out grants and funding' (quoted in Steele, Butler & Kingsley 2006).

When it comes to promotion criteria, there is an explicit preference for publication in Thomson Scientific-indexed journals. A serious risk of this high-pressure drive for publication in recognised publications is therefore to distort research priorities, as academics direct their research towards topics with a strong chance of publication in international journals rather than those identified as institutional and national priorities. The emphasis is much more on the metrics of citation indexes and the status of international rankings than on any measurement of the quality of the content and its appropriateness to the strategic research goals of the university or the country as a whole. A publication becomes 'a physical symbol for tenure and promotion rather than an effective model for the distribution of the research contained within [it]' (Steele, Butler & Kingsley 2006: 285).

[22] The Academy of Science of South Africa will be undertaking a research exercise in 2007, supported by the DST, to review the criteria for the acceptance for subsidy of books and conference proceedings.

The availability of a locally-accredited list of South African journals – such as that recommended in the ASSAf report – or an African citation list as suggested by Williams Nwangwu (2006), might in theory balance out the exclusionary nature of the Thomson and IBSS indexes. However at present the criteria for the inclusion of local journals in this list is very problematic and it is not at all clear that these publications are of uniform quality. The report of the Academy of Science of South Africa (ASSAf) (Gevers & Mati 2006) on scholarly publication in South Africa raises a number of concerns about the extent to which these journals were reviewed for their overall contribution to their discipline, and their disciplinary coherence. Other concerns include South African competence in the disciplines concerned, as well as the parochialism of a number of journals linked to particular institutions (2006: 44–5, 71, 75).

In this environment, the drive is to publish in an existing list of journals, leading to overload for the journals concerned, while important new research areas, such as educational technology, face a dearth of suitable publication outlets.

The South African Academy of Science proposals for a research publication strategy

The publication of the *Report on a Strategic Approach to Research Publishing in South Africa,* produced by the Academy of Science and commissioned by the Department of Science and Technology (Gevers & Mati 2006), is a particularly welcome indication that there is a commitment among South African policy-makers to begin to deal with the question of research dissemination. There are a number of recommendations in the report that would potentially impact on policy development (for more detail, see Chapter 5).

The report provides a detailed analysis of the state of scholarly publishing in South Africa, at least as far as 'accredited publications' are concerned. The focus is almost entirely on journals – reflecting the preoccupations of the broader research policy environment. The statistical analysis focuses in detail on the performance of South African publication in the Thomson indexes, reflecting the preoccupations of the country's research publication policy – which is not related to the delivery of development targets, but with the need for the country to reverse its apartheid-era isolation and demonstrate its participation in global ranking systems.

The recommendations of the project do, however, include a number of communicative efforts that could broaden the scope of research dissemination to a variety of audiences. Moreover, the report takes cognisance of the failures of the dominant scholarly publishing system, acknowledging that the 'study cannot only look backwards at a fast-vanishing system of international and local journals, publishing huge numbers of articles submitted (at no cost) by authors, reviewed

(at no cost) by other scientists, and sold back to the scholarly community at increasingly exorbitant cost, through library and/or personal subscription' (Gevers & Mati 2006: 8). The report therefore concludes that is essential that there is 'strategic management of national publication policy which is aimed at the future, and not the present or the past' (102).

The report makes a number of recommendations which, if they were to be implemented, would make a substantial difference. The main recommendations are: that funds should be allocated from the grants made by the Department of Education for research publication to support scholarly publishing in South Africa; that the Academy should function as a supporting and quality control body for scholarly publishing; and that Open Access initiatives should be undertaken with financial support from government, including the publication of Open Access journals and the development of a national system of Open Access research repositories. The report also calls for the DST to assume responsibility for driving an initiative to get national and international cooperation in developing a 'non-commercial, expanded, diversified and more inclusive international listing and indexing system for research journals, including those published in developing countries' (Gevers & Mati 2006: 119).

That said, the recommendations of the report remain broadly within the boundaries of the existing research reward system and appear to accept as a given the current framework of recognised scholarly journals, and conformity to international impact measurements. Acknowledging the pressures of a wide variety of existing stakeholders, the report aims to improve the status quo, rather than contemplating a more radical view of what such a policy initiative could look like if it planned for 2016 rather than 2006.[23]

What the report does achieve is extremely valuable – brokering the recognition that research dissemination is strategically important, needs government recognition and support and needs to be built up as a national asset. Taken together with its very sound Open Access recommendations, this might position this initiative as a vital staging post towards a more radical future policy initiative, one that could move beyond the journal paradigm to a wider conception of what development-focused research publication could look like.

The damaging impact of the international citation indexes

The research publication system that is favoured by these polices is one that is particularly disadvantageous to developing countries. Globally, research and dissemination output through scholarly journals

[23] That said, a meeting of the African Academies of Science (AAS), under the auspices of the International Academy of Science, meeting in May 2007, adopted a resolution that supported a more radical approach to using the potential of ICT to create a range of open communication outputs.

is very skewed, with the top four countries in the list of most-cited articles producing 84 per cent of the articles. As King reports in his *Nature* article on the national profile of citation impact, the 31 countries selected for his survey account for 97.5 per cent of the world's most cited papers, while 163 other countries, mostly developing countries, account for the rest. As he puts it: 'There is a stark disparity between the first and second divisions in the scientific impact of nations' (King 2004: 314. See also Chan & Costa 2005: 142; Willinsky 2006: 181).

The only African country on King's list is South Africa. In 2000 it was ranked 29 out of 31 and had just 0.5 per cent of the articles in the combined Thomson databases and 0.15 per cent of the most cited papers (King 2004: 314, Gevers & Mati 2006: 1), a figure that has declined in the last decade (DACST 2002: 32). Even this percentage, which the government regards as inadequate (DACST 2002: 35), far exceeds that of most other African countries.

South Africa publishes 35 journals that are accredited in the Thomson Scientific and IBSS indexes. Of these, 23 journals were in the Thomson and 14 in the IBSS indexes (with two of the latter also listed in the Thomson index). The other 220 appear only on the list of locally-accredited journals compiled by the Department of Educational (Gevers & Mati 2006: 25). Other African countries fare much worse: Egypt and Kenya have one journal each (Gevers & Mati 2006: vi).

The bias of the two major international journal databases is clearest in those places where knowledge is most likely to be regional. Steele, Butler and Kingsley warn in their *Learned Publishing* article on the influence of publication metrics:

> Care should be taken … in national comparisons, as even in the experiential sciences, where the Thomson Scientific data gains most acceptance, there are concerns about the uneven coverage of national or regional journals, and those written in languages other than English. (Steele, Butler & Kingsley 2006: 279)

Moreover, as they make clear, there are specific subject areas that suffer from a lack of coverage, and some of these – for example, palaeontology – are of great importance to Africa. Much of the social science and humanities research carried out in African countries has, by its very nature, a regional or national focus, which means that this literature is unlikely to appear in the international indexes, which seek broad-based influence. As Steele, Butler and Kingsley point out: 'geographical pre-eminence resides with North American and European journals in English, with many parts of the world under-represented in terms of coverage' (2006: 280). This is not to say that this research is not important. As the South African White Paper on Science and

Technology states at some length, social science research has a vital role to play in new knowledge generation and policy research:

> Human and social scientists play a vital role in providing critical analyses of national goals, choices about development policies and strategies, and other national issues pertaining to the transformation of South African society … Equally important to any society that seeks to be innovative in its response to the demands of global change is social research that identifies and explains global trends and their implications in areas of political and economic life, communication and lifestyle changes. (DACST 1996)

The bias in the disciplinary fields reflected in the Thomson-indexed journals emerges very clearly in an analysis of the South African journals in these databases: none of the accredited South African humanities journals, and only two out of 21 locally accredited social science journals are listed in the Thomson indexes (37–44). Viewed from a different perspective, in the social sciences and humanities only a small percentage (23% and 10% respectively) of journal articles are published in Thomson-indexed journals; most are published in local journals (77% and 90% respectively) (Gevers & Mati 2006: 37).

What is clear, therefore, is that the social sciences and the humanities - which are acknowledged in the policy documents as important mediators of development-relevant knowledge - are even more disadvantaged that other disciplinary areas in the accreditation systems supported by the research publication policy. The representation of South African articles in the different disciplines in the Thomson indexes is clearly demonstrated in Table 1, below.

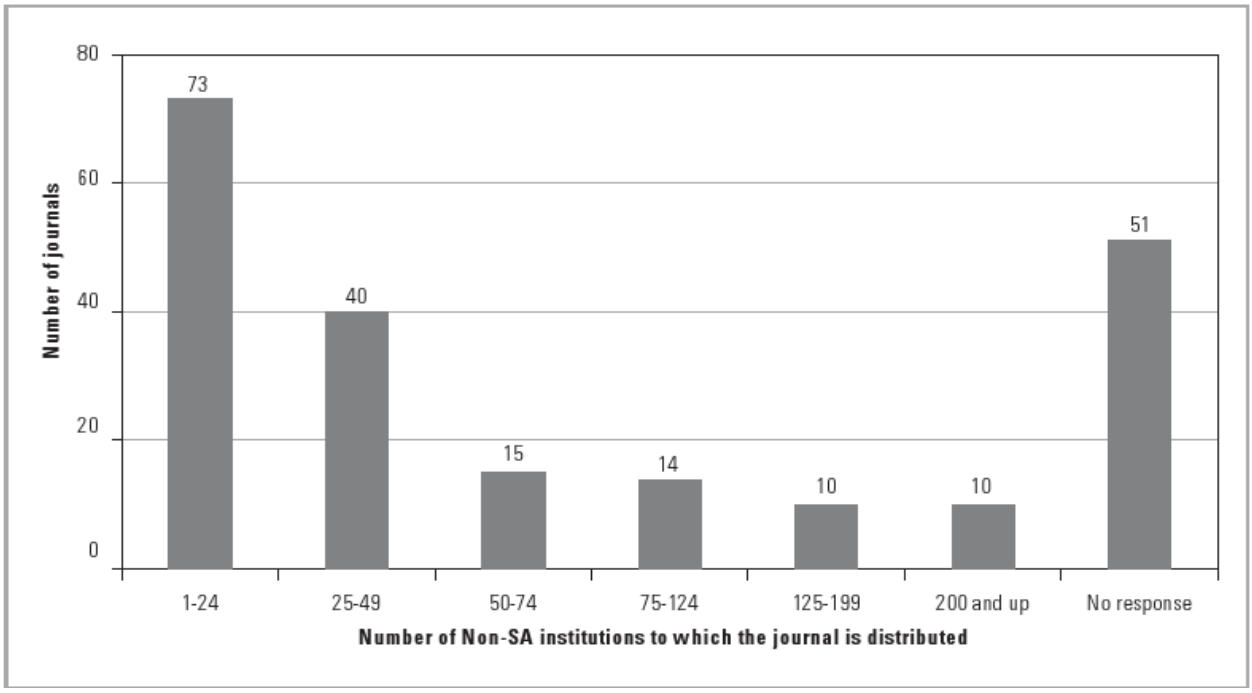
Table 1: South African articles in ISI versus non-ISI and foreign versus local proportions of articles, by scientific field

Main field	Classification by index (%)		Classification by region (%)	
	ISI	Non-ISI	Foreign	Local
Engineering Sciences	67.1	32.9	57.6	42.4
Medical and Health Sciences	79.4	20.5	63.9	36.1
Natural Sciences	85.0	15.0	61.0	39.0
Social and Economic Sciences	22.9	77.1	16.3	83.7
Arts and Humanities	9.7	90.3	6.9	93.1

Gevers & Mati (2006: 37)

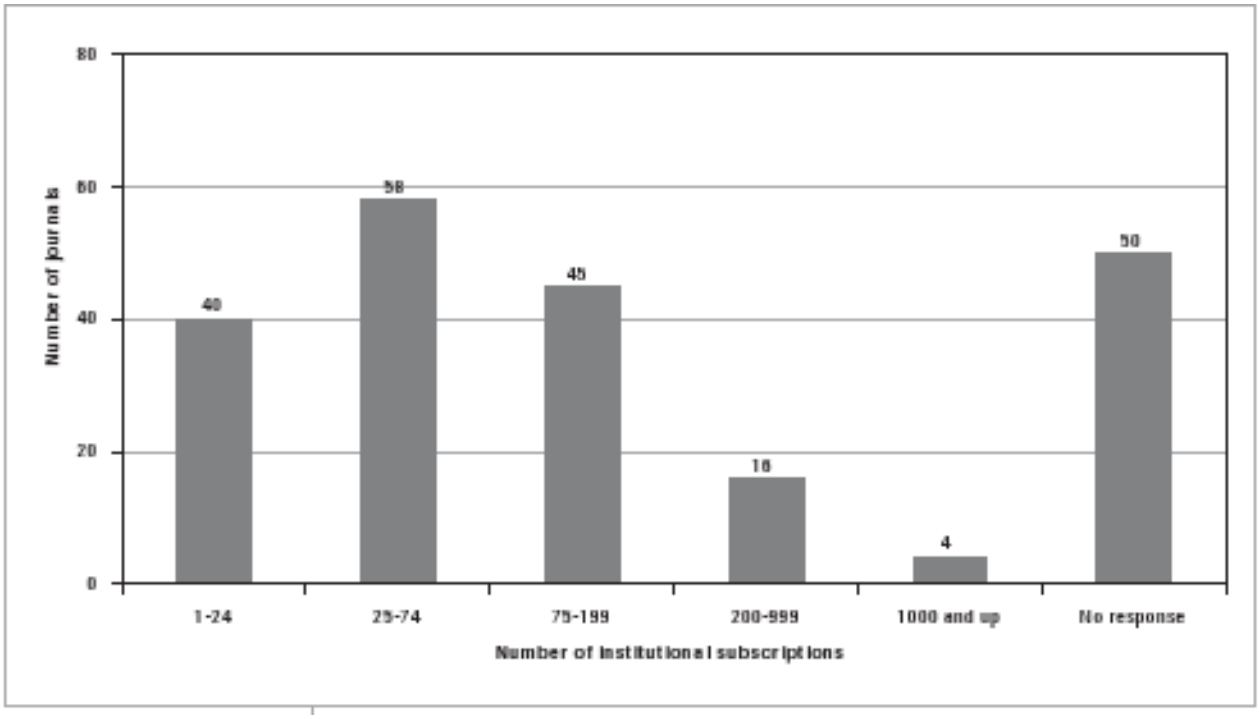
When it comes to locally-published scholarly journals, the subscriptions tend to be low, with most local journals having under 250 institutional subscribers overall (Figure 1). Most local journals also have a very narrow reach in their international print subscriptions, reaching fewer than 25 international institutions (Figure 2, below).

Figure 1: Number of non-South African institutions to which SA journals are distributed



Gevers & Mati (2006: 75)

Figure 2: Institutional subscriptions of accredited South African journals



Gevers & Mati (2006: 76)

African scholarly publishing policy

Higher education policy initiatives across sub-Saharan Africa tend to be very similar to those of South Africa, although South Africa has a more elaborated policy infrastructure than most African countries – for which a formal national policy for publication is a luxury not always contemplated in severely under-resourced systems. Instead, scholarly publication in Africa is most often treated at institutional level, or informally.

A pattern shared with South Africa is for the delivery of scholarly publication to be regarded as something that it is not the university's business to fund. While universities seem willing to invest very large sums of money in patent registration, presumably against the (largely unrealistic) expectation of revenue, the much smaller sums needed for publication do not feature in their budgets. University presses and journals are therefore required by their universities to become 'viable' or to 'break even', a very unrealistic expectation in the circumstances. This is an extreme version of what Joseph J Esposito calls the 'free rider syndrome'. Lamenting the failure of universities or donors to support university publishing, he argues with irony that, 'A university must provide for students and faculty and will actively encourage faculty to

publish, but a press can be stinted because it is always possible that a particular book will be published elsewhere' (Esposito 2006: 192).

The response from African universities would be that, given their extraordinarily straitened circumstances and the lack of finance for the most basic teaching, learning and research, the question of university publishing is a luxury that cannot be afforded. This is not an issue that can be ducked and the value of effective research dissemination will need to be reviewed in this context. However, one needs to bear in mind the findings of the Australian cost-benefit analysis of scholarly publication expenditure discussed in greater detail in Chapter 4, below, which demonstrates that there are considerable hidden costs for universities in the preparation of publications for submission to commercial publishers. (Houghton, Steele & Sheehan 2006) This is a salutary reminder that any evaluation of sustainability would need to be based on a hard-headed financial analysis rather than relying on received opinions in a context that is very vulnerable to unexamined preconceptions.

The pattern in Nigeria (Adebowale 2001; Olukoju 2004) – one that is familiar in a number of other countries, including Ethiopia, Ghana, and Kenya – is a range of survival strategies: the amalgamation of university presses and printing operations; diversification into products perceived to be more viable, such as textbooks; and publishing for trade markets. Journals tend to limp along, living from hand to mouth and depending largely on voluntary work from already stretched academics. Many of these journals have been ephemeral, or expedient efforts at self-advancement, and although there have been some successes in the creation of quality journals, these have not always survived the funding constraints that face them. 'Print-based journals remain the most prominent avenue of scientific communication in Africa, despite the declining capacity of African universities to subscribe to them,' according to Teferra (2004).

When it comes to electronic publication in Africa, the focus has been much more on access than on participation. Arising from the concern with the great difficulty that African universities have in accessing mainstream international journals as a result of high subscription costs, a number of international donor schemes offer free access or radically reduced subscriptions to journals in medicine and agriculture. While these are of great value in giving African academics access to mainstream international research, the dissemination of African research, within the content and globally, remains a problem.

The negative impact on African scholarship

A sinking ship – the failure of the traditional scholarly publication model

The scholarly publishing model reflected in South African research reward policy, and in the practice of most African countries, is one that is under serious challenge internationally and is increasingly regarded as dysfunctional. Most of the high-ranking journals in this system are in the hands of large commercial publishers, who stand accused of excessive price increases of the indexed and ranked journals that they control, as well as of anti-competitive practices, and IP 'lock-up' provisions. University libraries thus find themselves held hostage to pricing systems and journal 'bundling', over which they have little control (Benkler 2006: 323–4; Thompson 2005: 99–107; Wellcome Trust 2004; Willinsky 2006: 20–21).

Although this system appears to be regarded by many academics as 'traditional' and immutable, and is often treated as such by tertiary administrators, this commercialisation is in fact of very recent date: it grew in the 1970s and '80s in the wake of the massification of higher education in the '60s and '70s. Central in its establishment were the application of 'Bradford's law'[24], and the adoption of the 'core journal' philosophy that lay behind the creation of the hugely influential ISI Science Citation Indexes (now replaced by the Thomson Scientific indexes) (Guedon 2001; Gevers & Mati 2006). The effect of this system of scholarly evaluation is to push the marginalised even further to the margins in an already unequal global knowledge system.

The journals crisis is felt very acutely in Africa, where the effects of high prices are even more devastating, given weak currencies and a lack of resources (Willinsky 2006: 99–100; Gevers & Mati 2006). The criteria that apply to the selection of journals to the ISI/Thomson indexes by their very nature marginalise scholarly output from anywhere outside the major knowledge producers in North America and Europe, thus reinforcing the global knowledge divide. As Guedon (2001) makes clear, the system functions to create a kind of club, and to create brands that then reinforce both prestige and profits. And, as clubs tend to do, the system excludes through its selection processes and value criteria. Paul Zeleza has demonstrated, to devastating effect (1997), how the system is biased against women, racial minorities and scholars from outside of the metropolitan centres, and is built around Western realities, paradigms and values. It distorts research agendas in developing countries, drawing researchers to projects that will attract publication in the North rather than those of national concern. A dispassionate evaluation would hardly identify this as the knowledge

[24] This law estimates the exponentially diminishing returns of extending a search for references in science journals.

dissemination mechanism most suited to leveraging research information for maximal impact on social and economic goals on a continent facing massive development challenges.

'Publishing by numbers' is also coming under increasing attack. There has been an absurd growth in the number of scholarly books and journals published in the US: the total output of all university presses by 2000 was 31 million books, reports Lindsay Waters, Humanities Editor of Harvard University Press, questioning both the quality of this level of output and the actual readership of these books (Waters 2004: 7). 'The problem', he writes, 'is the concentration on productivity without concern for reception' (18). Zeleza concurs, from an African perspective: 'The intense pressure to publish', he argues, 'resulted in a perverse inflation of publication, in which dissertations were cannibalized and quantity mattered more than quality, and mountains of papers were churned out to be listed and indexed rather than read' (Zeleza 1997: 45). Waters agrees: 'Books – at least those that are actually published – have become in the system merely icons to be counted or worshiped, but not looked into. We have the sales figures and they are appalling' (Waters 2004: 29). Africa cannot afford this kind of wasteful publication.

The business and market parameters simply do not make sense – dramatic increases in publication output accompany a fall in purchasing power in the market, leading to smaller print runs and a spiralling decline in profitability for university presses. In the face of evidence that the traditional model of scholarly publication is not viable even in the richest book market in the world, one might question why there a presumption that it might work in Africa, where readership is relatively low, distribution costs are high, and international markets very difficult to access. Quite apart from anything else, the numbers simply do not work. As a Research Director at the CSIR in South Africa said at a recent workshop: 'There are over 1,000 researchers in this institution. We are required to publish two journal articles a year in accredited journals. That makes more than 2,000 articles in the limited range of subject areas that we cover. These journals simply do not exist.'

Why journals?

It is striking that the literature on scholarly publishing is almost exclusively – and even obsessively – focused on journals, just as South African policy documents talk almost exclusively of journals when dealing with publication output. (In the US, this is the case only in the scientific disciplines; for the humanities and social sciences the scholarly monograph reigns, with its attendant problems of over-supply.) In Africa, the journal system with its indexes and citation counts seems to hold an unchallenged and unquestioned supremacy in

the academic world as the most effective vehicle for scholarly communication.

From the perspective of a publisher, there is no obvious logic in this. While there might have been compelling arguments in the era of print for the availability of an assemblage of articles setting out the prevailing discussions in particular disciplines, changing technology – and the changing time-scales that have come with it – has rendered this obsolete. And yet even electronic journals for the most part follow this outdated model.[25] Moreover, the long delay before publication – which is the outcome of the peer reviewing process and the way the journals are assembled – means that journal information is all too often a matter of record: the history of an achievement rather than currently useful information. This is particularly the case in fast-changing technologies, but no less so in the human and social sciences, where the information being transmitted could often meet an urgent need, for example in dealing with the social impact of HIV/Aids, environmental crises, or with violence against women and children.

The journal article is not the most appropriate vehicle for social science publication. What is missing in the exclusive focus on journals is a sense of audience, a sense of whom the research is addressing and how best it could be packaged to reach that audience (or indeed multiple audiences).

It is interesting to note, in this regard, that the recent Australian report on scholarly publishing recommends policies for the recognition of a wider range of publication outputs, as well as the evaluation of their social impact (Houghton, Steele & Sheehan 2006). In the USA, the large and powerful Modern Language Association is formulating proposals for radical changes to the traditional publish-or-perish promotional track. These look likely to include recommendations for a much wider and more flexible set of criteria for tenure decisions. African universities will need to have the courage to grapple with these wider policy issues, rather than sticking to the traditional models that have served the continent so badly.

The finances of scholarly publishing

From the perspective of the university, scholarly publishing, as it presently functions, is a very poor deal. The university or research funder supplies the content (the research), pays for the authoring (the time of the researcher writing the article), and provides and pays for the time of peer reviewers. On top of this, it often pays page charges or formatting charges. It then cedes copyright and finally buys back its own research at prices which have escalated at four times the rate of inflation in the last fifteen years.

[25] A notable exception is the new Public Library of Science journal, PLOS One (http://www.plosone.org)

The commercial model of journal publication does not obey the rules of supply and demand. Quite a few journals occupy a monopoly position – university libraries have to subscribe, whatever the cost, because these journals have been established as 'must-have' resources for academics. The practice of 'bundling' does offer advantages of bulk pricing, but it reduces the space for choice, as the bundles now consume such a percentage of library budgets that libraries are unable to subscribe to smaller journals.

There is no room, either, for new journals to establish themselves, compromising the potential for smaller niche subjects and newer inter-disciplinary areas (Willinsky 2006; Chan & Costa 2005: 147; Lor & Britz 2004). It is clear that this is not a system that works to the advantage of developing countries, whose main interests, by their very definition, would tend to be regional, and marginal to the 'mainstream' so valued by journal indexes. In these circumstances, African publications, at best perceived as marginal, have practically no chance of being taken up by international institutional subscribers, in print or even electronic format.

There are a number of often-unquestioned assumptions in this traditional model that need to be resisted if effective research dissemination is to have a significant impact on African development. Foremost among these are that research dissemination is not the business of universities and should therefore be outsourced to commercial providers, and that scholarly publishing is a profit-based business and therefore universities do not need to fund it (Thompson 2005: 182–3; Esposito 2006). In fact, if research is to have an impact on development goals, then African governments and universities will need to accept that effective dissemination of research findings is a necessary investment. Without effective dissemination, research is locked up and much investment wasted.

With the exception of the biggest multinational journal publishers, scholarly publishing is at best a financially marginal business, even in the much larger markets in the global North. It is not a place where profits can be expected. As Lindsay Waters argues:

> There has emerged the unreasonable idea among administrators and some academic publishers themselves, who seem to feel compelled to comply with unreasonable expectations, that university presses should be turned into 'profit centers' and contribute to the general budget of the university … [T]he idea of milking the university presses – the poorest of all publishers – for cash is the equivalent of making the church mice contribute to the upkeep of the church. (Waters 2004: 5)

In spite of these failures – and criticisms – the conventional scholarly publication system still prevails as the dominant policy system globally

and in Africa, in the face of its manifest failure for African scholars. Given that academic promotion, and hence personal ambition, are intimately tied into this system, it is difficult to challenge it without raising the ire of academics, and changes are thus coming slowly – in Africa even more slowly than elsewhere.

African scholars thus face a difficult dilemma. On the one hand, their own promotion prospects and their credibility in the arena of global scholarship – and that of their institutions – depend upon their presence in the accepted scholarly publishing indexes. Yet the system, at least in the context of paid-for subscription journals, manifestly does not work for them, or for their institutions. Yet the common assumption underlying African research publication policy and strategy seems to be that there is – out there – some way of tinkering with this system which will make it work better for African research.

What is surely needed is a more radical view of what would be required to develop dissemination and publication policies, using the full potential of ICT – which could successfully deliver the ambitions of African research and innovation policies.

Access to African research knowledge

Right now, when it comes to the dissemination of its research, Africa is the silent continent, its voice hardly heard in either print or in digital research communications. It is clear that new solutions are needed to address this situation, using the potential of new technologies and new publishing models. The need is not only to find ways of improving access to global knowledge resources for African universities and their constituencies, but to grow the volumes of African research carried out and published by African scholars, out of Africa and in the diaspora.

This process will require the rethinking of a number of policies and publishing practices, as well as further research and investigation to explore ways in which digital media could be used to enhance the visibility of African research, build collaboration within and across African countries, and across developing nations worldwide. The evidence that I will be drawing on in this section of the paper demonstrates that the enhanced visibility that Open Access journal publication affords can lead to an upward pull on quality.

Increasing the volume of African research publication would require an approach that does not draw uncritically from the practices of the well-resourced and dominant information markets of the North, but which seeks rather to identify solutions that would work in an African context. In this process, Africa would do well to look to other middle economy and developing countries addressing these issues in creative ways. The SciELO alliance in Latin America is one such model, as are a number of Indian initiatives. (These are discussed in more detail in Chapter 4.) In the last year, South-South alliances have progressively been forged between Open Access advocates in the

middle economy countries, particularly India, Brazil and South Africa, and this is already beginning to have an impact in raising the profile of research from the developing world.

As the university leaders present at the Frontiers of Knowledge forum for African Vice-Chancellors concluded:

> As the stewards of continental knowledge and scholarship, African higher education institutions can play a leadership role in developing new institutions and business models for knowledge dissemination at the African and global levels. Some of the existing North American and European institutions can act as barriers to realising the potential of African knowledge and are under severe pressure themselves from the advance of open source and Open Access approaches. (Frontiers 2006a: 6)

At this conference, university leaders showed a growing consensus that the use of digital media and Open Access publishing models might provide the breaks that African research needs to find its voice, both for its own purposes and in the global arena, and in spite of the difficulties in connectivity in many African countries.

ICT policy and connectivity in Africa

It is common cause that, in many African universities, low bandwidth, poor connectivity and unreliable electricity supply are serious barriers to the use of digital technologies. This often leads to the conclusion that Africa needs to continue its reliance on print alone, in spite of the fact that Hans Zell's image of Africa in the 1980s as a 'bookless society' (Zell 1992: 68) persists to this day, and in spite of the barriers already mentioned that inhibit the distribution of print publications in Africa.

The figures for African connectivity are indeed depressing: the digital divide runs deep. Only 11 per cent of the world's population has connection to the Internet, according to UNESCO, and 90 per cent of people who are connected to the Internet come from the industrialised countries (UNESCO 2005: 29). In Africa, connectivity levels are low, at 3.6 per cent of the population. Nevertheless, a defining feature of African connectivity is its very rapid growth: 625.8 per cent of usage growth from 2000–2006 (Ng'ambi 2006: 10). Besides this, the university sector is much better off in terms of connectivity than the rest of the population, thanks to investment in tertiary networks and, although the levels of bandwidth and access to the Internet is variable, the prediction is that at least in the metropolitan areas, there is potential for academics to reach acceptable levels of connectivity in a relatively short time. The rapid turnaround in countries like Ethiopia and Rwanda in this regard are cause for optimism.

There was a general consensus at the Frontiers of Knowledge Forum that the time had come for universities to exercise their collective power to pressurise governments and call on donors to deliver fibre bandwidth to African universities – as an essential service required for national economic growth, rather than a luxury. And, as John Gage of Sun Microsystems argued, to general approbation, the costs of fibre access would not be prohibitive and the benefits substantial. He advocated the adoption of entrepreneurial and collaborative approaches to begin to solve Africa's connectivity problems (Frontiers 2006b: 27). At the workshop for African Academies of Science in Pretoria in May 2007, a similar mood prevailed and concrete recommendations were made for generating rapid improvements in connectivity and bandwidth. These included unconventional approaches such as identifying already-existing large infrastructure projects that involve cable-laying, and negotiating to piggy-back fibre networks – a low-cost approach.

In short, in spite of considerable problems, there appears to be consensus that the African higher education sector must move forward in adopting digital communications for research purposes. Given the advantages that digital communications could offer in bridging the knowledge divide and in delivering economic benefits, it would appear that African governments need to seek donor funding for effective ICT infrastructure, and implement policies that will ensure the steady expansion of Internet connectivity to African universities and research organisations.

The potential of digital publishing for African research dissemination

Where connectivity is available, there are major advantages for the dissemination of research. The advent of the Internet has made it possible for researchers to communicate their findings instantly, at minimal cost, around the globe. This has not only changed research practice, which has become more collaborative and less bounded geographically, but has also provided, for the first time in centuries, the potential for entirely new publication models. Digital dissemination of research output can impact most effectively in precisely those areas in which African publishing suffers most:

- It reduces the marginal cost of publishing (i.e. the cost of making more copies), offering more flexibility and scalability in widespread markets;
- Distribution costs are near-zero, once the infrastructure is in place (although that infrastructure is a major issue in Africa);

- A far greater amount of research gets done – the geographical and market obstructions which inhibit print distribution (a particularity acute problem in Africa) fall away;
- Peer to peer networks allow for collaborative and interactive research development with the potential for increased research effectiveness, particularly where resources are at a premium, such as in the developing world.

In short, digital media offer the opportunity for African scholarship to reach an international readership away from the constraints imposed by global imbalances coupled with high production and distribution costs in the world of print publication. Leaping the technology gap to take advantage of this potential would therefore appear to be an attractive option for African research – even more attractive than to the countries that dominate research publication, where scholarly publication is rapidly moving online (Swan 2006).

CHAPTER FOUR: OPEN ACCESS PUBLISHING

The 'Gold Route': Open Access journal publishing

The idea of Open Access publication emerged in the wake of scholars' protests in North America and Britain in 2002 against the escalating costs of journals and against what they perceived as exploitative subscription models of digital journal databases. Turning on its head the conventional commercial model for journal publication, the idea emerged that investment in the initial stages of the supply chain, instead of paying subscriptions at the end of the supply cycle, would mean that journal content could be delivered online free of charge. Universities, already investing heavily in the traditional publication model, providing authorship, peer reviewing, and editorship free of charge, and often paying page charges and graphic illustration charges on top of that, have been ceding copyright and earning no royalties. Their institutions then buy back the publications at ever-increasing subscription charges, running at inflation rates that are steadily putting scholarly publications out of the reach of even the richest universities (Swan 2006: 10). This means that in this particular publishing arena, sustainability issues are less of a challenge than in other publishing fields, such as textbook production, where publishers incur heavy development costs in commissioning the writing of books.

The initial idea of on-line publishing was then that journals would be funded by author fees paid once an article was accepted for publication. The journal would then be available, full text online, free of charge.[26] This 'author pays' model was subject to some criticism, as many felt that it would disadvantage authors from developing countries and from disciplines, such as the humanities, that were not well endowed with research funding. Subsequently, most Open Access journals have offered discounts or waivers to authors (which in reality most often means institutions or research funders) and those who cannot afford the author fee. In the African context it is likely that if an 'author pays' model were to be introduced, it would need a secure line of government or institutional support. Moreover, it is increasingly emerging that Open Access journals use a variety of sustainability models and many do not depend upon author fees, but use advertising, sponsorship and institutional support to provide a revenue stream for their publications.

[26] The best source of information on all aspects of Open Access scholarly publication can be found in Peter Suber's overview article in his Open Access Newsletter website: http://www.earlham.edu/~peters/fos/overview.htm

The Open Access publication model thus offers online access, free of charge, to peer-reviewed journal articles and conference papers, as well as to technical reports, theses and working papers. There are no price barriers or restrictions on access to these materials. They can be used for research and teaching and are also readily accessible to people outside of the academic system (Swan 2005). Open Access publishing is not vanity publishing or uncontrolled posting of content onto the web, but is a form of *peer-reviewed scholarly publishing*, following a different business model.

Open Access scholarly publishing offers the potential for democratic access to research knowledge, widening out the conventional scholarly market, which is targeted primarily at a peer group of fellow-scholars, to a much wider range of readers and stakeholders in both the public and private sectors. As the Budapest Initiative puts it:

> There are many degrees and kinds of wider and easier access to this literature. By 'open access' to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited. (Soros Foundation 2002)

A number of similar international declarations and statements on Open Access have been drawn up, all setting out the advantages of Open Access for the advancement and democratisation of research knowledge. These include the Berlin Declaration on Open Access in the Sciences and Humanities and the Bethesda Statement on Open Access, which focuses on biomedical research. Open Access is perceived in these statements as a way of making research knowledge and the cultural heritage globally accessible, a way of creating an interactive international scholarly community, and sharing knowledge.

Open Access publication removes the price barriers which block access to global knowledge for African researchers and also makes developing country research more accessible because, in the Open Access model, it is not competing for subscription budgets in libraries that are struggling to subscribe to the mainstream Northern journals.

Open Access publication does not, as some authors fear, lay them open to unregulated use of their content. This form of publication does not waive copyright protection but uses a copyright licence in

which an author chooses to release the work free of charge, but may well retain some rights, such as attribution or the prohibition of commercial uses of the work[27]. Nor do Open Access journals waive peer review: most journals use the traditional peer review processes, although some journals, such as PLOS One[28,] are experimenting with new models of online collaborative peer review.

One obvious and very beneficial difference is that publication can be much faster. An electronic journal does not have to wait to assemble an issue before publication and so articles can be posted to the journal as soon as they have been accepted and edited. This means that citations can be tracked from an earlier stage, enhancing the tendency for Open Access journals to achieve higher citation impact (Gevers & Mati 2006: 94–95).

The number of Open Access journals is growing rapidly. At the time of writing (mid-2007), there were 810 journals and 135 000 articles listed in the Directory of Open Access Journals which is published by Sweden's prestigious Lund University.

Open Access journals for African researchers

The conventional orthodoxy seems to have become that the best route to Open Access is the creation of open access repositories, with pre- and post-prints of journal articles posted online. This makes sense, as it is a quick and easy way of providing access to scholarship published in international journals which would – for developing countries – otherwise often be inaccessible in their country of origin. This means that there is still a winning situation for the universities that push for publication in accredited journals for the sake of personal and institutional prestige. There is also a considerable emphasis among funding agencies on the need for repositories as the first and best way of providing access to developing country research.

There are two recognised routes to Open Access publishing: the so-called 'gold' and 'green' routes. The gold route is the direct route, and involves publishing Open Access journals (or books). Its culmination would be if all 24 000 or so journals in the world were to convert to Open Access. The green route is the repository route, in which authors publish in traditional journals, but then make their articles available by archiving them as pre- or post-prints in Open Access 'repositories'.

Given the importance that African universities place on establishing their international research credentials, and given the low representation in the research indexes of many crucial areas of African research, the growth of a strategically-managed set of African Open Access journals might be a first priority. Some of the arguments for

[27] See, for example, the suite of Creative Commons licences available on http://www.creativecommons.org
[28] http://www.plosone.org/home.action

using the open repository rather than the gold route revolve around the need to protect what are currently valuable publishing resources in the USA and Europe. USA and European authors would have a lot to lose if there were to be a general failure of commercial scholarly journals. Africa, however, has a very limited investment – and a limited presence – in the traditional print-based scholarly publication system and this frees policy-makers to engage with new trends in ways that their more privileged counterparts in the North may be constrained from doing. Bearing in mind that South Africa has only 23 journals listed in the ISI indexes (most African countries have none, and Kenya and Ethiopia have one each), it becomes clear that the African continent as a whole is hardly at all invested in the global scholarly publishing system. It would seem then that Africa has real potential to leapfrog technological gaps using the 'gold route' – in fact this might be an imperative rather than an option.

The authors of the ASSAf report comment that South African policy-makers in tend to support policies that would foster the growth of locally-produced journals and, particularly, policies that would increase the percentage of journals that are both South African and on the international indexes. It is also likely that such policy initiatives in South Africa would support Open Access publication. The ASSAf report endorses Open Access journal publication (see Recommendation no. 6 in Chapter 5) as the way forward, and the Department of Science and Technology appears to endorse this recommendation (Gevers & Mati 2006: 118–9).

Open monographs – a South African case study

Because the global system for scholarly rankings focuses so strongly on journal articles, discussion of scholarly publishing – and Open Access discussions are no exception – tends to neglect the value of other kinds of publication output. This is in spite of a clear need for a variety of publishing formats if research is to achieve the social and economic impact that the policy-makers seek.

Interestingly enough, the leading international case study of Open Access publication of scholarly books and research reports is probably that of the Human Sciences Research Council (HSRC) in South Africa, recently described in a British Council report (Blecher 2006: 44–6; Gray, Bruns & van Schalkwyk 2004). This case study demonstrates that Open Access publication of a wide range of outputs – monographs, research reports, discussion papers, and popularisations – can considerably enhance the social, political and economic impact of publication. It also demonstrates the importance of professional publishing and marketing skills in achieving this impact, as well as the positive benefits of financial support for research publication.

In 1995, the International Development Research Centre (IDRC) put out a report on research policy in South Africa. A telling sideline of this report was its findings on the HSRC, which it described, at the time when the report was written, as 'one of the most controversial research institutions in South Africa', an organisation 'irretrievably tainted by its contribution to much of the analysis behind "grand apartheid"' (van Ameringen 1995). The report reveals that the HSRC was at that time still regarded with suspicion, and was perceived as the organisation with the greatest need to demonstrate its appropriateness in the new South African higher education system.

At a crucial stage of a comprehensive transformation process undertaken about five years later under the leadership of CEO Mark Orkin, a strategic decision was taken to build a carefully-targeted publication programme designed to provide effective dissemination of HSRC research, in line with the organisation's mission to provide 'research that makes a difference'. The new publication strategy provided for online Open Access publications in parallel with high quality print versions offered for sale at subsidised prices. A professional publishing department was built up and publications were designed to meet the needs of the different audiences of HSRC research, from politicians, policy-makers and academics to general readers. Outputs included research reports, monographs, collections of articles, discussion documents, and popularisations.

These publications were aggressively marketed to profile the achievements of the new research programmes of the HSRC, and were often published almost immediately, in order to ensure an immediate impact of research findings. This combination of digital dissemination, new commercial models and forward-thinking market strategies has proved remarkably effective, making the HSRC Press's open access website a first

stop for politicians, policy-makers and academics worldwide, and helping to ensure the impact of its development-targeted research programmes.

Given the role that this innovative and effectively-managed publication programme played in the transformation and re-positioning of the HSRC, it would be interesting to see further research on the contribution and impact of effective publication in the mix of strategies used to deliver development goals, earn the trust of government and policy-makers, and recreate the organisation as one with a respected and valuable role to play in a democratic South Africa.

The 'Green Route': Open Access repositories

About 15 per cent of authors already archive their work, following the 'green route' to Open Access. The other 85 per cent still need convincing, but research has shown that if employers or research funders require self-archiving, then 95 per cent of researchers will do it – and 81 per cent will do it willingly. (This is very similar to the earlier response of researchers to the imposed publish-or-perish idea.) For institutions that mandate self-archiving, the percentage of authors that do so is getting close to 100 per cent. [29]

Among other things, Open Access repositories may contain journal articles and other publications by a particular author, department or institution; theses and dissertations; subject-specific archives, and cultural heritage collections. The documents in these repositories have the same advantages as Open Access journals – that of making research knowledge universally available free of charge.

Repositories of journal articles can serve a particularly useful role in rendering accessible articles published in proprietary journals that might otherwise be inaccessible because of high subscription costs. Most journals today allow the posting of preprints (the version of the article submitted to the journal before peer review and editing) or post prints (the article revised after peer reviewing, but usually not the edited and typeset version published by the journal). In the case of post prints there might be an embargo period determined by the journal publisher[30].

This option allows for the best of both worlds: the article can be published in a prestigious indexed journal and yet be universally available. However, repositories can be and are used for a wide range of publications, beyond journal articles, including the kind of research output that might be classified as 'grey literature' yet is relevant to national needs and is most often unavailable to those who need it.

There are a growing number of Open Access repositories in South Africa, notably institutional repositories at Rhodes University, the

[29] http://eprints.ecs.soton.ac.uk/11006/

[30] The SHERPA/Romeo website provides comprehensive and regularly-updated listings of journal publishers that allow for the posting of pre-and-post prints. http://www.sherpa.ac.uk/romeo.php

University of Pretoria, and Stellenbosch University, as well as the Law Faculty and Computer Science repositories at the University of Cape Town and the Higher Education Policy repository at the University of the Western Cape. There are also a number of collaborative ventures, for example that between the African Studies Centre at the University of Leiden and Codesria (the Council for the Development of Social Science Research in Africa) for the creation of the Connecting-Africa repository at the University of Leiden for African studies content from Africa and the Diaspora.

As yet there are no national or institutional mandates in Africa that I am aware of for the deposit of articles in repositories. In recent workshop and conference discussions, a number of which have been run in African countries by eIFL (an Open Society project), a common theme has been that there needs to be more advocacy for the advantages of repository maintenance, and better liaison between librarians and academics, as well as policy interventions to motivate for funding frameworks.

Increasingly, research funding organisations and national research bodies are requesting or mandating the archiving of publications arising from the research that they fund. These include the UK House of Commons Science and Technology Committee; the National Institute of Health in the USA; the UN World Summit on the Information Society (WSIS); the European Community; the Wellcome Trust; the Australian Research Information Infrastructure Committee; The Australian Government Productivity Commission; Research Councils UK; CODATA and the International Council for Science (ICSU) (Gevers & Mati 2006: 93).

When it comes to a choice between the ‘green’ and ‘gold’ routes to Open Access, one needs to bear in mind the scales involved. If South Africa were to adopt a policy of depositing pre-or post-prints of all journal articles published in foreign journals in the ISI indexes, this would represent, at current publication rates, around 3500 articles a year – hardly an insurmountable task. So perhaps South Africa should be ambitious and go for both the green and gold routes for journal articles.

The advantages of Open Access publishing for developing countries

There are particular advantages to Open Access publication for developing countries. Free online availability can overcome the barriers to the dissemination of developing country content in an inequitable global knowledge system, and can also open up access to research publications from the rest of the world. This of course includes access

to publications from other developing countries: Open Access removes the considerable barriers to South–South scholarly communications.

There are indications that there is a substantially higher citation level for journals available on open access. Open Access provides improved visibility, an increase in submissions – from a wider range of countries – improved circulation, and worldwide reach (Chan 2002). This can be well demonstrated by case studies of Open Access successes in the developing world.

The Indian Journal of Postgraduate Medicine – an Indian case study

A striking case study, often cited as an example of the advantages of Open Access to developing countries, is the Indian *Journal of Postgraduate Medicine*, published by Medknow Publishers, which moved from being a locally-produced print journal in India to an Open Access journal distributed by Bioline International. It now gets 1 million hits a year and the total number of submissions increased from 190 in 2000 to over 800 in 2006. The number of submissions from authors outside India rose from less than 10 percent in 2001 to 38 percent (166) in 2003 and 30 percent (189) in 2004. It seems that the journal is now being seen as an international journal capable of reaching a global readership and is attracting a different – and wider – kind of authorship (Kirsop & Chan 2005: 251).

Dr DK Sahu, the Director of Medknow Publishers, speaking at the Bangalore Workshop on Electronic Publishing and Open Access in 2006, reported a similar – if not so dramatic – increase across the range of Medknow journals when they were moved to open access, with a common pattern of improvements in the international profile of authors, higher hit rates – indicating wider readership – and increased impact factors (Sahu 2006).

In common with other developing world Open Access journal publishers, Medknow has found that maintaining print subscriptions alongside open access electronic publication is a way of generating revenue and ensuring the sustainability of their journals.

A similar increase in submissions from authors from outside the country and an increase in hits on the journal was reported by the editor of the South African Journal of Environmental Education at a recent conference at Rhodes University (May 2007). It does appear that Open Access publication has particular advantages for developing countries.

The issue of sustainability

All too often, when problems with the commercial, 'subscriber pays' model of journal publication is raised and Open Access is mentioned, the response is an anxious query about where funding would come

from to pay for a more open publishing system. What this reveals is a presumption that research dissemination is not the business of universities, but is outsourced to commercial providers. What it also reveals is that the academic community does not realise that it is already paying for scholarly publication, albeit in ways that universities do not conventionally track.

In a recent report commissioned by the Australian government, the authors (Houghton, Steele and Sheehan) calculated the cost of the various contributions made by higher education institutions to the publication of journal articles. Computing the time involved in the various contributions of authoring, peer review, and editorial activities, they came up with hidden costs of AUD19 000 ($14 000) per journal article. The cost of a scholarly monograph they estimate at AUD155 100 ($115 000) (Houghton, Steele & Sheehan 2006: 11–23).

This gives pause for thought in the African context. What are the real costs of the numbers of journals and other scholarly publications run as volunteer efforts in departments across the continent?

The report go on to quantify the benefits of improved R&D access, developing formulas for measuring the financial impact of increased dissemination, and concluding that there could be very substantial financial returns from a switch to Open Access scholarly publication. These could well be recalculated to provide estimates of real returns in the South African – and other African - economies.

According to this study, there are also a number of measurable benefits relating to the increased impact provided by Open Access. Research costs, they argue, could be impacted by:

- Speed of access: speeding up the research and discovery process and, potentially, reducing the time/cost involved for a given outcome, and increasing the rate of accumulation of the stock of knowledge;
- Improved access, leading to reduced duplicative research and improving efficiency;
- Faster access, leading to better-informed research, reducing the pursuit of blind alleys, saving R&D expenditure and improving the efficiency of R&D;
- Wider access, providing enhanced opportunities for multi-disciplinary research, and inter-institutional and inter-sectoral collaborations;
- Wider access, enabling researchers to study their context more broadly, potentially leading to increased opportunities for and rates of application/commercialization;
- Improved access leading to improved education outcomes, enabling a given budget to produce a higher level of education attainment.

Potential benefits for industry and government could be:

- The potential for wider access to both accelerate and widen opportunities for adoption and commercialisation, thereby increasing returns on public investment in R&D and private investment in commercialisation;
- The potential for much wider access – for example for GPs, nurses, teachers, students, small firms in consulting, engineering, architecture, design, electronics, software, biotechnology, who may currently have limited or no access – with a likely impact on quality of services and, possibly, productivity in these sectors of the economy;
- The possibility for the emergence of new industries based on open access content. In turn these might enhance research evaluation and lead to better-focused R&D expenditures. (Houghton, Steele & Sheehan 2006: 32–3)

The conclusion of the report is that 'a move towards more open access may represent a substantial cost-benefit advantage'. A pragmatic exercise to calculate the real costs of traditional publishing models and the benefits of Open Access in Africa could well lead to a different perception of the sustainability of Open Access scholarly publishing. Moreover, it one were to add to this ways of evaluating the social and economic impact of effective publishing, then one might well start to break down the universities' current reluctance to support research publication.

Given the difficulties faced by developing countries in finding the capacity for effective research dissemination, there are considerable advantages to be found in the development of regional networks. The building of thematic journal collections and inter-operable repositories, for example, can substantially increase the impact of scholarly output – as the SciELO consortium in Latin America has successfully demonstrated.

The advantages of regional cooperation: SciELO in Latin America

One of the pioneers of Open Access journal publishing in developing countries and a model of the effectiveness of regional collaboration in Open Access research dissemination is the Scientific Electronic Library Online (SciELO)[31] project from Brazil. SciELO hosts 125 journals dealing with health and other sciences published in Brazil and other Latin American countries. SciELO is a collaboration between the Foundation for the Support of Science of São Paulo and the Latin America and Caribbean Center on Health

[31] http://www.scielo.b

Sciences Information, BIREME[32], and has significant government funding and support.

SciELO operates as a network of national and thematic collections of open access journals, which are managed so as to be inter-operable, using Open Archives Initiative protocols. Around 55 000 articles with Latin American and Caribbean affiliation were online by 2006 (Packer 2006).

The combination of regional collaboration and Open Access has dramatically improved the global visibility, accessibility, and impact of science from Brazil and other regions of Latin America. Article downloads have increased from 1000 in 1998 to 6 million in 2006. SciELO articles appear in Google Scholar statistics as having the third highest hits globally, and citation levels are increasing (Packer 2006).

The economics of SciELO are interesting. Figures from 2005 show that, with $1 million of government support, there were 150 journals online, at about $650 per journal. With close on 10 000 new articles online, the cost per article was around $100. The total of 60 000 articles available indicates a longer-term investment of around $16 per article per year. There have been 27 million downloads, representing 3.7 cents per download. (Packer 2006). The lesson would appear to be that regional cooperation in the delivery of online Open Access research publishing, supported by government subsidy, is a worthwhile investment.

I could, perhaps, best conclude by quoting the recommendations of the 2005 Salvador Declaration on Open Access – a Developing World Perspective, drafted in Bahia, Brazil:

> We urge governments to make Open Access a high priority in science policies including:
> - requiring that publicly funded research is made available through Open Access;
> - considering the cost of publication as part of the cost of research;
> - strengthening the local OA journals, repositories and other relevant initiatives;
> - promoting integration of developing countries' scientific information in the worldwide body of knowledge.
>
> We call on all stakeholders in the international community to work together to ensure that scientific information is openly accessible and freely available to all, forever.

However challenging the issues may be, it seems that the question of electronic knowledge dissemination and publication in Africa has to be put more firmly onto the policy agenda at international, national and institutional levels, and needs better integration into the wider policy

[32] http://www.bireme.org

environment, in order to advance the potential for effective research impact on the development challenges that the continent faces. Perhaps, as Gilberto Gil put it, we can ‘connect the differences’ and take African scholarly publishing forward successfully into the twenty-first century, creating the strength of its presence in global scholarship.

CHAPTER FIVE: POLICY RECOMMENDATIONS

This study has revealed gaps and contradictions in research dissemination policy in South Africa, which seem to be matched in various ways in other African policy environments. The main problem that has emerged is a clash between research and innovation policy on the one hand, and the policy governing and rewarding scholarly publication on the other. Research and innovation policy places a strong emphasis on the contribution of higher education research to national development – social, economic and political upliftment – whereas the policy (only recently implemented) for the reward of research publication centres on personal achievement in the international scholarly rankings. Most of all, there is a serious mis-match between the development goals of the research and innovation policies, which are focused on national needs, and the publication reward system which places international over national needs.

This paper has tracked the negative impact of this clash on South African research – the distortion of research agendas; the export of research knowledge into international publications, from where it may well be inaccessible to local readers; the endorsement of quality measures and value systems that are biased against African researchers; and the penalising of collaborative and inter-disciplinary research through an excessive emphasis on personal achievement and 'originality'.

In the academic community at the moment, it is mostly young and junior scholars who demonstrate familiarity with new models of technology-driven scholarly communication in conference presentations and the projects they initiate. But there is a serious risk – and this has been commented on in a number of conferences I have attended, including a meeting of the African Academies of Science in May 2007– that the system for reward and promotion is alienating young researchers in Africa. More than 40 per cent of journal articles in the indexed journals are by men over the age of fifty (and this ratio is increasing), and only 20 per cent are by women (of all ages) (Gevers & Mati 2006: 48–9). Moreover, while research and innovation policy places a high value on collaborative research and the use of ICTs, the system of journal indexes is slow to move and takes time to incorporate these new fields of knowledge.

There are further problems. Within research and innovation policy there are tensions between the developmental goals articulated as the main purpose of research policy – which would seem to call for public interest values in the higher education system – and the commercial models that emerge to evaluate research performance. While the

language describing research goals talks of development targets and innovation achievements, the way in which the success of these programmes is measured is in 'number of patents registered' and 'journal articles published'. This report has tracked the problems posed by such measures and the limitations of proprietary intellectual property models when it comes to delivering research impact for development needs. While patents and journal articles have their value, an excessive focus on them to the exclusion of any other output risks inhibiting, rather than delivering, the desired development outcomes, There is, in other words, a serious gap between the intentions of research policy and strategy, and the way in which performance is measured.

When it comes to making policy recommendations to remedy this situation, however, one faces a dilemma, caused by the conservatism that is entrenched in the system, particularly among academics who have performed well in the existing environment and who are therefore likely to be at or near the top of the higher education hierarchy. In particular, these academics see the publication system as a traditional locus of university values and a central site of quality delivery. This harks back to the problem of unchallenged assumptions explored at the start of this paper. It must be said, however, that the damage is done not because this publishing system is valued – it has its place in any university system – but because it is asserted as the *only* publishing system that is valued and supported.

Policy reforms can happen only when there is some consensus on the issues involved and a basis of support in the stakeholder communities concerned. In the case of research dissemination policy and the impact that information technology is having, studies have revealed a general pattern in which there are pockets of academics who are aware of the potential of new technologies and Open Access, but a general lack of knowledge and a number of misperceptions about these issues among the majority (De Beer 2005, Ouyo 2006). While awareness is growing, there needs to come a 'tipping point' where there is a sufficient weight of consensus to drive change.

The need for advocacy

It is interesting to note that, in the roundup of the recent OECD online conference on Open Education Resources, there was a general consensus that the major need for future research interventions was for advocacy campaigns. If one accepts that scholarly publication has entered a period of radical change, then interventions for policy reform would need to be accompanied by information and advocacy programmes if the more conservative constituencies in the scholarly community are to be drawn into the new environment. There would be

a need to spell out research findings on the advantages offered by new technology and new copyright models, exploring and dispelling the myths that prevail – that Internet publication is poor quality, that Open Access is vanity publishing, that there is no peer reviewing of Open Access publications... As John Willinksy describes, a typical interview with a reluctant scholar need not be adversarial:

> Yet at the very point of the discussion when the air is charged with exposed vulnerabilities and vanities, the wise and experienced open access advocate looks up and asks, 'Did someone mention journal impact factors and citation counts?' The advocate then quickly sets up a pre-prepared Power Point presentation, with slide after slide showing, in study after study and discipline after discipline, that open access is associated with increased citations for authors and journals, when compared to similar work that is not open access. (Willinsky 2006: 22)

A constituency will need to be built up, not only by such persuasive campaigns, but more concretely by the accumulation of positive examples – as in the use of case studies in this paper. Only then will there be a real likelihood of effective policy reform in the higher education sector.

International and regional policy

National research and innovation policy is inevitably influenced by the international policy framework of organisations such as UNESCO (at the global level) and NEPAD (at the regional level). The tendency in the policy documents on research and innovation in these bodies is to articulate the problem of the knowledge divide, the lack of capacity in African universities, their disadvantaged position in the traditional scholarly rankings and journal indexes, and the dominant position of the large industrialised nations in controlling and exploiting patents and other IP rights. The potential for the unhindered reach of the Internet combined with Open Access publication to resolve some of these issues is acknowledged (UNESCO 2005; NEPAD 2006).

However, when it comes to concrete recommendations for policy interventions to redress this situation, the UNESCO report, *Towards Knowledge Societies*, is typical in proposing development solutions which depend upon the maintenance and adaptation of the existing system rather than considering a thorough review of its appropriateness. The framing paradigm is that followed by the large knowledge-producing countries of the North, and there is no search for African-appropriate solutions. And so, in addressing the question of bridging the knowledge divide, this UNESCO report focuses on a series of measures that would advance performance in terms of conventional

metrics – the number of researchers, the patents registered, technology exports, ICT infrastructure, etc.

What is absent in the report is any discussion of non-proprietary methods of knowledge production and dissemination, and the potential that non-commercial collaborative development and peer-production might have to unlock greater capacity for the dissemination of African research. In the few places where this model does come into play, it results in recommendations for the release of content from the North through differential pricing and free provision of scholarly publications for African countries (UNESCO 2005: 159–178). For example, the HINARI[33] and AGORA[34] projects delivered by the International Network for the Availability of Scientific Publications (INASP) are typical in this regard, offering large databases of health and agricultural journals free of charge or at reduced prices.[35] This is commendable in providing access to what would otherwise be inaccessible but vital resources for African countries, but it does not answer the problem of growing the levels Africa-relevant knowledge dissemination. In this way, the idea is entrenched in policy proposals that the locus of research knowledge and expertise is still in the North, and the role of African research is to play catch-up using the very framework that is acknowledged to disadvantage the continent.

What I would argue therefore, is that discussion is needed in this policy context, in UNESCO, NEPAD and other international organisations, to find ways to articulate policy frameworks that move the focus away from access, towards participation. These would need to consider Africa's participation in global research, using not only the conventional measures but also evaluating non-proprietary approaches to knowledge production, – as is evidenced, for example, in the successful African Genome project.

This process could draw on discussions that have been held in WSIS, and in the Development Agenda in WIPO[36]. For example, the Declaration of Principles of the ICSU at the 2003 WSIS conference contains the following clauses:

> 25. The sharing and strengthening of global knowledge for development can be enhanced by removing barriers to equitable access to information for economic, social, political, health, cultural, educational, and scientific activities and by facilitating access to public domain

[33] Health InterNetwork Access to Research Initiative.
[34] Access to Global Online Research in Agriculture.
[35] It is telling to note recent complaints from Peru that HINARI is no longer carrying the top-citation journals, or journals from a number of major publishers – in contrast to the situation in 2003 (*PloS Medicine*, 26 June 2007). This demonstrates the risks that developing countries face when they do not control their own knowledge resources, but are dependent on handouts.
[36] The World Intellectual Property Organization

> information, including by universal design and the use of assistive technologies.
>
> 26. A rich public domain is an essential element for the growth of the Information Society, creating multiple benefits such as an educated public, new jobs, innovation, business opportunities, and the advancement of sciences. Information in the public domain should be easily accessible to support the Information Society, and protected from misappropriation. Public institutions such as libraries and archives, museums, cultural collections and other community-based access points should be strengthened so as to promote the preservation of documentary records and free and equitable access to information.
>
> 28. We strive to promote universal access with equal opportunities for all to scientific knowledge and the creation and dissemination of scientific and technical information, including open access initiatives for scientific publishing. (ICSU 2003)

(It is worth noting that the South African Department of Science and Technology has declared its support for these principles.)

The OECD Declaration on Access to Research Data from Public Funding, and its Principles and Guidelines on Access to Research from Public Funding – also adopted at WSIS in 2003 – entrench the principle of universal and open access to research data across the world as a way of overcoming global inequalities in the knowledge economy. Governments and institutions are called upon to ensure that there is a policy and a regulatory framework to ensure a people-centred approach to building broad and cost-free access to research data in support of development goals (OECD 2003). South Africa is a signatory to the OECD Declaration.

While these international declarations on access to knowledge would go a long way towards opening up a more equitable global information environment, more would need to be done at national level to ensure greater output of African research knowledge, out of Africa.

Intellectual Property - the WIPO Development Agenda

In October 2004, the General Assembly of the World Intellectual Property Organization agreed to adopt a proposal offered by Argentina and Brazil, the Proposal for the Establishment of a Development Agenda for WIPO. This document focused on the need for access to information, arguing that:

> While access to information and knowledge sharing are regarded as essential elements in fostering innovation and creativity in the information economy, adding new layers of intellectual property protection to the digital environment would obstruct the free flow of information and scuttle efforts to set up new arrangements for promoting innovation and creativity, through initiatives such as the 'Creative Commons'. The ongoing controversy surrounding the use of technological protection measures in the digital environment is also of great concern.

The recommendations of the Development Agenda include the need for acknowledgement of public interest flexibilities in the policy space of member states; ensuring that treaties are balanced and take on the interests of consumers and the public at large; recognition of the relevance of Open Access models for the promotion of innovation and creativity; and the need to ensure that enforcement procedures are fair and equitable and do not lend themselves to abusive practices by rights holders.

The Development Agenda also addresses the need to reverse a trend towards ever-increasing layers of protection in IP law, particularly in the treatment of digital media, pointing out that these do not necessarily advance innovation and creativity, but do impede access to information. In discussing the question of technology transfer, the Development Agenda argues for a global Treaty on Access to Knowledge and Technology relating to publicly funded research.

International Policy Declarations

There have been two international declarations that deal with Open Access from a developing world perspective. The Salvador Declaration on Open Access – The Developing World Perspective (2005) states, among others, that:

> In a world that is increasingly globalized, with science claiming to be universal, exclusion from access to information is not acceptable. It is important that access be considered as a universal right, independent of any region.
>
> Open Access must facilitate developing countries' active participation in the worldwide exchange of scientific information, including free access to the heritage of scientific knowledge, effective participation in the process of generation and dissemination of knowledge, and strengthening the coverage of topics of direct relevance to developing countries.

The recommendations of the Salvador Declaration are as follows:

> We urge governments to make Open Access a high priority in science policies including:

- requiring that publicly funded research is made available through Open Access;
- considering the cost of publication as part of the cost of research;
- strengthening the local OA journals, repositories and other relevant initiatives;
- promoting integration of developing countries scientific information in the worldwide body of knowledge.

We call on all stakeholders in the international community to work together to ensure that scientific information is openly accessible and freely available to all, forever.

The Workshop on Electronic Publishing and Open Access held in Bangalore in November 2006 and attended by delegates from India, Brazil, China, and Africa, also passed a policy declaration – A National Open Access Policy for Developing Countries - which recommends the mandating of research repositories. The policy is in the form of a declaration for signature by participating governments. It states that, as a condition of research funding, the government concerned:

1. **requires** electronic copies of any research papers that have been accepted for publication in a peer-reviewed journal, and are supported in whole or in part by Government funding, to be deposited in an institutional digital repository [IR] immediately upon acceptance for publication;
2. **encourages** Government Grant Holders to provide Open Access to their deposited papers immediately upon deposit;
3. **encourages** Government Grant Holders to publish in a suitable Open Access Journal where one exists.

The document goes on to spell out the advantages of such Open Access deposit to scientific research, research institutes, universities, authors and readers. These include making national research accessible to global researchers, thus increasing use and citation; increasing the impact of researchers' publications; increased access to the body of research by fellow-researchers; and increased regional research collaboration and sharing.

What both of these declarations stress is the importance of creating policies that mandate access to publicly funded research, thus opening up research from the developing world and helping to enhance collaboration across the South, thus increasing the impact of developing world research both nationally and globally.

Regional collaboration

The fostering of regional collaboration, along the lines of SciELO in Latin America could go a long way towards consolidating the presence of African research and reducing the global knowledge divide. This could be fostered through the existing initiatives of the African Academies of Science, with the support of the NEPAD Science and Technology grouping.

As part of this regional collaboration, participating countries could consider the potential for an African citation index, as proposed by Williams Nwangwu (2006) and supported by Codesria.

National policy

Intellectual Property

New and more open approaches to scholarly dissemination do not need immediate legislative changes in intellectual property law in order to operate effectively. Creative Commons licences offer authors the possibility of freeing up access to publications while still protecting their moral rights and the right to citation, within the existing legislative framework. These licences offer, for example, protection of the integrity of a document and enforcement of the need for attribution. They are enforceable in a court of law. (There are Creative Commons licences available that conform to South African law.[37])

Policy interventions and legislative changes are needed to ensure *access to* rather than just the protection of the *production of* knowledge that is in play in scholarly publication. The question of fair dealing provisions comes into play when scholars need to use secondary sources and there is general agreement that these provisions need amendment in the South African legislation. The question of territorial rights and parallel importation could be addressed in relation to the cost of imported books; and access to research from public funding needs to be assured through policies that mandate deposit in Open Access repositories.

In general, the South African government appears sympathetic to the idea of public access to government information, although on the ground there tend to be variations in practice from department to department.

Incremental change – the Academy of Science of South Africa proposals

In South Africa there is an encouraging indication of movement in research dissemination policy, evidenced in the recommendations of the *Report on a Strategic Approach to Research Publication in South Africa*, commissioned by the Department of Science and Technology and produced by the Academy of Science of South Africa (ASSAf) (Gevers & Mati 2006: 116–120). These recommendations work within the conventional framework of journal publication, rather than proposing radical departures from the existing system. They are therefore likely to provide a good starting point for introducing reform in a conservative community. These recommendations build on the

[37] http://www.creativecommons.org

idea of strengthening the local output of journals, rationalising journal production and providing support for journal editors, and promoting the use of Open Access as a way of getting greater exposure and increased impact for South African journals. A key goal would be to increase the number of South African-published journals in the international indexes.

The recommendations with policy implications are:
Recommendation No 1: 'That all stakeholders in the South African research enterprise should each in their own way support local/national journals that actively seek to be of international quality and are indexed in an internationally recognised, bibliometrically accessible database.' This recommendation, aimed at growing the quality and number of national journals and ensuring their international recognition, proposes that financial support for such an exercise could be provided by a combination of a R1000 per article institutional charge plus the diversion of 1.4 per cent of the publishing subsidy stream to support publication costs.
The idea is to grow the volume of high quality local journals to increase the overlap area, presented graphically in Figure 1, which represents local (Department of Education) journals in international indexes

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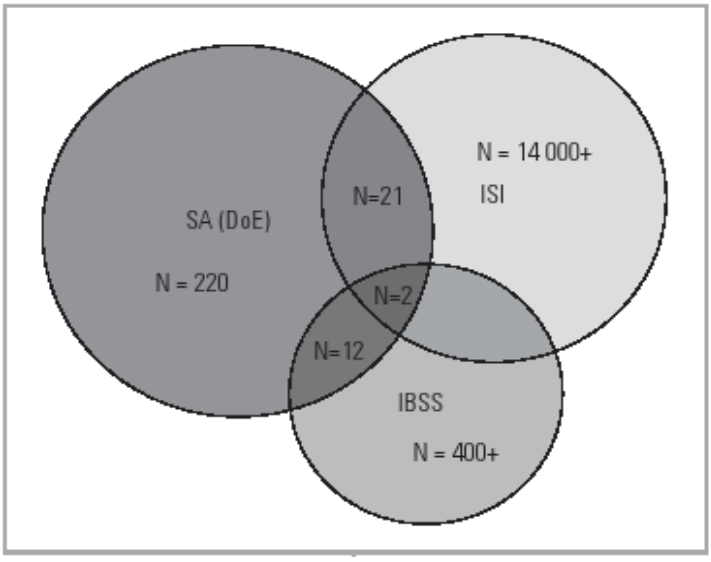

Figure 3: South African journals by index

Diagram from *Report on a Strategic Approach to Research Publication in South Africa.* (Gevers & Mati 2006)

Recommendation No 2 deals with the need to design a 'robust, well-informed and accountable mechanism for the accreditation of research journals' and other scholarly publications. This would involve the

national Department of Education and the Department of Science and Technology; as well as national statutory bodies such as the Council on Higher Education and the NRF; and the institutions and science councils.

Recommendation No 4 calls for the inclusion of research publications and the value of dissemination within the quality criteria evaluated by the Higher Education Quality Committee, the body which provides quality control for the entire South African higher education system. In other words, publication must become an integral part of quality evaluation, instead of being treated as a separate issue.

Recommendation No 5 calls for ASSAf to be the body mandated to carry out quality audits of South African research journals on a 5-year cycle.

This would go hand in hand with **Recommendation No 7**, which proposes the creation of a national research publications information and research centre, coordinated and mandated by the Department of Science and Technology and formed from a consortium of agencies.

Recommendation No 6 deals with Open Access. This recommendation would involve the Department of Science and Technology taking responsibility for a number of measures:

- agreement on funding for Open Access journal publication through a flat-rate per article charge, to be paid for by institutions and by diversion of part of the DoE publication subsidy;
- support and start-up funding for a system of national institutional repositories (international experience suggests that the deposit of articles be mandated if such repositories are to be effectively populated);
- the creation of a system of national harvesting of Open Access repositories, preferably through the NRF;
- support for the provision of adequate bandwidth for research organisations.

Recommendation No 9 calls for the creation of 'a non-commercial, expanded, diversified and more inclusive international listing and indexing system for research journals, including those from developing countries'. This would require action on a national and international level and would again include the Department of Science and Technology and the Department of Education, and the NRF. This recommendation could be evaluated alongside the proposal made in a paper by Williams Nwangwu – and enthusiastically endorsed by the conference participants – at the ASC Leiden/Codesria Conference in

September 2006 for the creation of an African citation index (Nwangwu 2006).

The *cumulative effect* of these recommendations, which would not require radical policy reform, would be to create a coherent scholarly publication system, supported at government and institutional level, with funding mechanisms in place. A quality assurance system and provisions for training delivery should ensure incremental increases in the quality and prestige of the publications. Those supported would be principally journals, but with some attention paid to books and conference proceedings.[38] The framework of international indexes of scholarly publications is retained, but with the addition of a developing-country-friendly index, designed to 'level the playing field'.

In this scenario, the Academy of Science would be the body responsible for ensuring quality standards for journal publication and for monitoring the effectiveness of the system. This is in line with the recommendations of a recent (May 2007) meeting of African Academies of Science, convened under the auspices of the International Academy of Science, which agreed that the role of African Academies of Science should involve independent research and advice on research policy issues, including publications. It is worth noting that in Latin America, the successful SciELO scholarly publishing cooperative operates at national level largely through Academies of Science (Packer 2006).

Framing all this is a set of Open Access provisions, funded from the existing publication subsidy system and by an institutionally-funded 'author' fee. Government would provide, in addition, for the creation of a nationwide system of institutional repositories, with harvesting at a national level.

If implemented, these recommendations would create a coordinated national scholarly publishing system of Open Access publications which would certainly provide a powerful window onto South African research and would democratise access to research knowledge out of South Africa. The focus here is predominantly on scholar-to-scholar communications, although **Recommendation No 8** calls for the Department of Education to become involved in promoting the use of journals and 'magazines that present the country's foremost scientific work in accessible form and … [are] effectively linked to the media'. What infrastructure would be needed to deliver such popularisations and how it would be funded are not spelled out in the ASSAf policy, although there is recognition that there would be a need for 'top-down sponsorship and appropriate resourcing' (Gevers & Mati 2006: 119).

[38] A project for review of the criteria for the accreditation of books, chapters in books and conference proceedings is currently being initiated (2007).

Scholarly publication policy at national level in South Africa

Social impact

An issue that the above-mentioned ASSAf proposals do not deal with, however, is the question of how research dissemination can be better geared to the delivery of the social and economic goals that the DST research and innovation policy and strategy documents aim for. This is an important issue, as the government is steadily increasing its R&D expenditure and will be looking for returns from its investment in the public institutions. According to the of the Minister of Science and Technology in his May 2007 Budget Speech, research expenditure has increased faster than the increase in GDP and last year stood at R14 billion or 0.91 per cent of GDP. The government is therefore rapidly approaching its research expenditure target of 1 per cent of GDP, consolidating South Africa's position as the leading research and innovation centre in Africa.

How can this publicly-owned knowledge resource best be integrated into a wider knowledge system that contributes effectively to the objectives of national and regional development strategies? Right now, as we have seen above, the policy framework that measures the capacity of universities to transform the knowledge they produce into public good is almost entirely expressed in terms of commercially entailed products in the form of patents and copyrights – in other words privatised public goods. This approach can all too easily lock up the knowledge produced rather than releasing it into the community, resulting, as Martin Hall warns, in a perception within government that they are not getting a good return on their funding of university research. The universities need, Hall argues, to recognise that:

> to acquire public credibility and support, they need to show how their work is responsive to the pressing objectives of development. In pursuit of this, they need to develop a range of smart interfaces with both the state and private sectors, promoting effective knowledge transfer, and showing, through example, how there can be a valid social and economic return on public investment in their resources. (Hall 2005: 15)

Effective and open research dissemination and publication would be part of this process. The question is how this perception could be transformed into policy and whether policy intervention is needed at national and/or institutional level.

Once again, it would appear that to rectify this situation would not require radical policy reform. The problem at the moment, as we

have seen, is that the evaluation system for success in innovation is too narrowly measured in patent counts, while the reward system for publication has forced higher educational institutions into a concentrated drive for journal publication.

The recently published Australian report on Public Support for Science and Innovation, the product of long consultation, is helpful in analysing this problematic situation, which is reflected in a number of countries. The report argues that a balance is needed when considering the role of public support for commercialisation activities in universities. Placing undue emphasis on commercialisation for financial gains, the report cautions, may have unintended effects:

> Universities' core role remains the provision of teaching and the generation of high quality, openly disseminated, basic research. Even where universities undertake research that has practical applications, it is the transfer, diffusion and utilisation of such knowledge and technology that matters in terms of community well-being. Commercialisation is just one way of achieving this. *The policy framework for universities should encourage them to select the transfer pathway that maximises the overall community benefits, which will only sometimes favour commercialisation for financial gains.* (Productivity Commission 2007: xiii – my emphasis)

In South Africa, this goal could be dealt with in part by negotiating a wider range of evaluation criteria in the DST's strategic plans for research and innovation, and opening up discussion with stakeholders as to how the public sector's contribution to national development targets could best be measured, outside of the commercial and numeric measures currently in place. In South Africa, as elsewhere, further research is needed on ways of measuring the social and economic impact of research.

Opening up scholarly communications for the achievement of social impact should, equally, be achievable without too radical a revision of policies. One step that needs to be taken is to recognise, as is hinted at in the ASSAf recommendations, that scholarly publication should not only consist of scholar-to-scholar communication through scholarly journals, but should also encompass whatever output is needed to achieve the goals inherent in the research programme concerned and in the national policy framework. This would be a matter of matching resources with objectives and supporting dissemination outputs that match the research project concerned, whether this be journal articles, research reports (as in the case of the HSRC Press), community and training manuals, popularisations of scientific work, or other type of publication. Moving beyond the print paradigm, these outputs could also be interactive online resources,

blogs and podcasts, mobile phone content and open education resources.

The criteria for evaluation of publications for subsidy is discussed in the ASSAf recommendations, but they need reviewing, as a much wider range of potential outputs must be recognised. This could change radically the criteria underpinning dissemination evaluation, in turn impacting on promotion criteria in institutions.

A further issue that would need to be addressed if there is to be a truly effective and wide-ranging research dissemination infrastructure in South Africa would be the need for editorial and publication skills and infrastructure for the production of these resources. If the ASSAf approach described above is followed, publication would be funded by government through the diversion of a percentage of the publication subsidy and through research funding for the projects concerned. However, if a broader approach is taken regarding what constitutes suitable research outputs, then there will have to be further investigation of infrastructure needs and sustainability models for these outputs.

In addition to what ASSAf is proposing by way of policy reform, policy-makers could consider some of the additional recommendations emanating from policy discussion in Australia. The principles articulated for Australia's Accessibility Framework, currently being developed with the universities, is that 'there will be a system-wide approach for managing research outputs and infrastructure so that they are "discoverable, accessible, and shareable"' (Productivity Commission 2007: 229).

The Australian government is investing considerable time, money and expertise in a widely-consultative process, aimed at a thorough overhaul of its research systems, to meet twenty-first century needs. There is a great deal that can be learnt both from the process itself – where it is succeeding, and where there are problems – and from the content of the many documents being generated.

Institutional policies

Academic reward and promotions

In South Africa, as a result of the funding earned by institutions for publication in accredited journals and books, there is considerable pressure exerted on academics by their institutions to reach publication targets that would ensure growth in this line of funding. The result is the entrenchment of a 'publish or perish' mentality when it comes to academic rewards and promotions. Performance appraisal guidelines tend to give prominence to publication counts as a key factor in promotions and – as has already been mentioned – a failure to reach adequate publication targets can, in the policies of some

institutions, even lead to curtailed salary increases, and withheld promotions. Given the limitations of the journal indexes in the South African context, this is clearly more than problematic.

This situation is unusual: in other countries the publication record of an academic is simply used as a basis for tenure and promotion, whereas South African policy also provides substantial financial rewards to institutions for academics' publications. Nor, as we have already seen, is it immune from criticism from scholars and publishers alike.

The MLA Task Force on Evaluating Scholarship in the USA

The Modern Language Association Task Force on Evaluating Scholarship in the USA, in response to a similar situation in its constituency – in this case an excessive focus on monograph publication – comments that 'scholarship should not be equated with publication … publication is not the raison d'être of scholarship; scholarship is the raison d'être of publication.' The Task Force makes the following recommendation in relation to the evaluation of publications for tenure:

> We urge the members of the MLA and of the wider academic community to recognize – and to act on the recognition – that valuable and important scholarship can take multiple forms and that requirements for tenure and promotion should be tailored to the mission of the institution. In our view, a body of essays or articles in peer-reviewed journals can demonstrate the quality of scholarly work as well as or, in some cases, better than a monograph of similar length. Moreover, edited collections of articles, critical editions, annotated translations of important primary texts, essays written for a general audience, trade books, textbooks, and pedagogically useful monographs, as well as publications or other professional work in electronic form, may contribute to a body of scholarly and professional work that can meet the highest standards of scholarship in the tenure-review process. (MLA 2005: 40)

The Task Team also makes recommendations for digital publications, drawing attention to the widening range of possibilities emerging, including large-scale digital archives, databases and e-journals. One recommendation is that tenure committees must learn about electronic publication in order to be able to evaluate electronic submissions.

In South Africa, negative preconceptions about the quality of electronic media and Open Access models would need to be dispelled if there is to be a fair evaluation of such publications in performance evaluation.

Integrated communications management

One way of achieving a more wide-ranging and comprehensive set of policies and strategies for the management of research publication could be in the creation of university-wide networks and structures to bring together all the players in order to achieve a coherent vision of all the institution's communication needs. A useful case study in this regard is the University of California. In the case of the University of California, the library is a key player in the process of managing the university's scholarly communications, through the Office of Scholarly Communications. Open Access is an important issue on the agenda and the University of California Press and other publishing units on the

different campuses collaborate to explore innovative models of university press publishing.

An integrated communications management approach from the University of California

Given the ways in which electronic media are changing scholarly communications, an important, if neglected, area of institutional policy is the need to integrate all aspects of scholarly communication across the academic community, administration and student body. In the new communications environment, a collaborative effort is needed to ensure that the university makes the most of the opportunities offered by new developments, and that academics and librarians work together to manage open resources for the sake of maximum access.

In the case of the University of California (UC), this involves an effort, across the whole institution, to manage all aspects of scholarly communication, from the management of library resources, to scholarly publication, and repository management. Senior administration, faculty and librarians are brought together to ensure effective management of matters such as how faculty handle their IP rights when signing contracts for journal publication; ensuring that faculty understand the implications of the journal subscriptions they order; promoting the advantages of publication in Open Access journals, etc.

The UC libraries help to analyse the economics of the current model of scholarly publishing, and are working with faculty to better align cost with value in the materials they purchase. They are also working with UC Press and others to create and host experiments in scholarly publishing. Finally, as suggested by their faculty and administrative advisory groups, they are assembling as much information as possible about the challenges and opportunities of Open Access.

The Academic Council Special Committee on Scholarly Communication has a wide-ranging role that includes investigating methods of cost-effective production and the wide dissemination of scholarly works; evaluating possible business plans for the production and distribution of these works, including optimal methods of financing (e.g. author costs, pay-per-view, commercial, etc.); ensuring that dissemination methods are optimal and of high quality, and can be used as the basis for peer review and academic advancement; determining faculty interest in initiating new publications if they seem feasible and advisable; assessing the interest of scholarly societies in new methods of publication, and attempting to find ways to mitigate possible adverse effects such methods might have; evaluating possible legal issues pertaining to new methods of publication (e.g. fair use, disclosure, collusion, etc.); considering the role, if any, of the UC Press and the California Digital Library in these new ventures; and considering the role, if any, of commercial publishers in these new ventures.[39]

[39] http://libraries.universityofcalifornia.edu/scholarly/

In other words, this is a thorough-going integration of the library, faculty and administrators across the academic community to ensure an institution-wide and integrated response to what they see as the untenable state of the current publishing system. At the same time, this collaboration allows the institution to take maximum advantage of the new possibilities offered by developments in digital media.

Summary of policy recommendations

1. Advocacy and research

There is a need for advocacy to promote the importance of effective and broad-based research dissemination as a way of achieving greater impact for African research, nationally, regionally and globally. Such advocacy would argue for the recognition of a wider range of publications, addressed not only to scholars, but aimed at the broader community. Alongside this, advocacy is needed to spell out the advantages of Open Access - particularly in the developing world context - in increasing research impact and reach.

Advocacy campaigns would need to be accompanied by the development of effective case studies to provide working examples of how research dissemination can be transformed and what impact this transformation is having.

2. **International and regional policy**

Access and participation: At an international level, policy initiatives that address the global knowledge divide need to move from an approach driven by the idea of *access* – in other words the idea that developing world problems would be solved by providing greater access to global knowledge resources – to a recognition of the need for greater *participation* by African countries in knowledge production. This would also require international policy documents to move beyond narrowly-focused proprietary and commercially-driven metrics for the evaluation of research performance to recognition of the importance of non-proprietary, collaborative approaches to knowledge production and dissemination.

Access to publicly funded research: An important strand of such a policy environment would be the creation of policies supporting Open Access to publicly funded research, along the lines proposed by the OECD Declaration and the Salvador and Bangalore Declarations.

The WIPO Development Agenda: This programme (which is now showing signs of being accepted for implementation[40]) if implemented, could deliver a less punitive and more open international IP dispensation, offering more equitable access to knowledge and more flexible regimes for the fostering of innovation and creativity in developing countries.

Regional collaboration: Regional collaborative initiatives for the advancement of scholarly communications, such as SciELO are recommended, as is the development of an African citation index.

3. **National policy**

[40] See, for example, the Knowledge Ecology International Statement on the conclusion of the Development Agenda negotiations in June 2007.

Intellectual Property Law: Greater openness for research dissemination could be achieved without the need for changes in IP law. However, there is a need to address the inconsistencies in South African IP legislation in relation to Fair Dealing and special provisions for educational and library use. It would be desirable to investigate the question of territorial rights and their impact on the cost of imported books.

Access to research from Public Funding: Policies for Access to Research from Public Funding could provide mandates for the deposit of research publications in institutional repositories, for national harvesting, opening up the availability of research knowledge.

Support for Open Access research publication: As recommended by the Academy of Science of South Africa, there needs to be financial and logistical support for scholarly publication at a national level. This could include the provision of funding derived from top-slicing a small percentage of the Department of Education remuneration for research publication in accredited journals. An alternative listing and indexing system for journals could contribute to raising quality standards while at the same time ensuring the national relevance of journals. Support for Open Access publication would increase visibility and impact.

Support for a wider range of publications: However, support for research dissemination needs to go beyond the traditional focus on journal articles if research publication is really to impact on national development goals. At national level, a more positive rating for publication in books and conference proceedings is needed as well as the recognition of the importance of other, less traditional publications, such as research reports and popularisations. Electronic publication needs clearer recognition.

Social impact measures: There is a need to initiate research into the development of social impact criteria as opposed to the current, proprietary and commercially-focused metrics.

4. Institutional policies

Academic reward and promotions: If research publication is to be development-focused and not only geared to international prestige, then institutions would need to address a wider range of criteria for academic reward and promotion, more closely geared to the overall aims of national higher education and research and innovation policies.

Integrated communications management: There would be a good deal to be gained if institutions were to take an integrated approach to scholarly communications and the use of digital media. This could include policies for the creation and management of institutional Open Access repositories; support for the management of the contracts signed by academic authors; and addressing the publishing needs of the institution and providing support for research dissemination and publication. In other words, the institutions would endorse the centrality of research dissemination and publication, as well as access to research knowledge.

Conclusion

The possibility clearly exists for South Africa – and for the continent as a whole - to move forward in transforming its scholarly communications, using twenty-first century technologies and new publication approaches to meet the development challenges facing the country. What would be required in the first instance would be a concerted programme of research and advocacy, followed by a policy reform process that could work from the existing legislative and policy framework – without the need for radical legislative reform. Judging from the cost and benefit analysis pioneered by the Australian government, this could bring substantial rewards in terms of economic and social impacts.

ABBREVIATIONS AND ACRONYMS

AAS	African Academies of Science
Aids	Acquired immune deficiency syndrome
AMCOST	African Ministerial Council of Science and Technology
ARIIC	Australian Research Information Infrastructure Committee
AU	African Union
BIOS	Biological Innovation for an Open Society
CGIAR	Consultative Group on International Agricultural Research
CIPR	Commission on Intellectual Property Rights
Codesria	Council for the Development of Social Science Research in Africa
CODATA	Committee on Data for Science and Technology
DACST	Department of Arts, Culture, Science and Technology
DMCA	Digital Millennium Copyright Act
DoE	Department of Education
DST	Department of Science and Technology
EU	European Union
GDP	Gross Domestic Product
HIV	Human Immunodeficiency Virus
HSRC	Human Sciences Research Council
IBSS	International Bibliography of the Social Sciences
ICSU	International Council for Science (formerly International Council of Scientific Unions)
ICT	Information and Communication Technology
IDRC	International Development Research Centre
IP	intellectual property
IPF	International Policy Fellowship
ISI	Institute for Scientific Information
NCHE	National Commission on Higher Education
NEPAD	New Partnership for Africa's Development
NIH	National Institute of Health
NPHE	National Plan on Higher Education
NRF	National Research Foundation
OECD	Organisation for Economic Co-operation and Development
OSI	Open Society Institute
PIPRA	Public Intellectual Property of Agriculture
R&D	Research and development
SciELO	Scientific Electronic Library Online
UC	University of California
UN	United Nations

UNESCO	United Nations Educational, Scientific and Cultural Organization
WIPO	World Intellectual Property Organization
WSIS	World Summit on the Information Society (UN)

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