The African Journal of Information and Communication

Issue 10
2009/2010
Thematic Edition

SCHOLARLY COMMUNICATION AND OPENING ACCESS TO KNOWLEDGE

LINK (Learning-Information-Networking-Knowledge) Centre
Graduate School of Public and Development Management
University of the Witwatersrand, Johannesburg

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The African Journal of Information and Communication (AJIC), a South African Department of Education accredited journal, is published by the Learning Information Networking Knowledge (LINK) Centre, Graduate School of Public and Development Management. The *AJIC*, previously *The Southern African Journal of Information and Communication* (*SAJIC)*, is an annual, interdisciplinary journal concerned with Africa's participation in the information society and network economy. It focuses on information and communication technology (ICT) issues at the global, regional and national level that have implications for developing countries in general, and for Africa and the Southern African region in particular. It encourages debate on various aspects of ICT policy, regulation, governance, strategy and emergence, with interest in the multiple relationships between technology, the economy and society. It is intended to be both a rigorous academic journal and a practical medium to engage the continent's actors and decision-makers in government, industry and civil society, across the many diverse areas where information, communications and new media play a role.

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submission of articles

The ***African Journal of Information and Communication*** is accredited by the South African Department of Education. Note that the closing date for the submission of articles for the 2010 issue (No. 11) of the Journal is 30 June 2010. Those wishing to contribute should submit articles to the Interim Editor on luciennesa@gmail.com. Submission, refereeing and publication requirements are available on the LINK website at http://www.ajic.org.za, and in summarised form below.

Note to Authors

Submissions – Articles for publication in the *African Journal of Information and Communication* (*AJIC*) should be submitted to the Interim Editor, Lucienne Abrahams, at the LINK Centre, Graduate School of Public and Development Management, Witwatersrand University, Johannesburg, on: luciennesa@gmail.com. **Length** – Articles should not exceed 8 000 words in length, including the Abstract and References. Book reviews, comments, reports or rejoinders to articles should be much shorter, usually 1 000-3 000 words. Contributions are received with the understanding that their contents are original, unpublished material and are not being submitted for publication elsewhere. Translated material that has not been published in English will also be considered. The Editors reserve the right to edit or otherwise alter contributions.

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Presentation – The first page of a submission should contain the title, author's name, affiliation, full postal address, and telephone, fax and e-mail contacts. Affiliations and contact details of co-authors should also be listed. The second page should contain an abstract (summary of the article's contents) of 200-500 words. The article should begin on the third page.

References – The referencing format is that of the APA sixth edition.

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EDITORS' COMMENT

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Thematic Edition 2009/2010: Scholarly Communication and Access to Knowledge

This edition of the African Journal of Information and Communication addresses an aspect of 'information society' discourse that has taken shape in the world of universities, research, publishing and creative works. Given the potential offered by the Internet to leapfrog the divides that currently inhibit the reach and impact of African research, this thematic edition explores an African perspective on scholarly communications in the 21st century. What is the university's contribution to knowledge on the African continent and how does it make this contribution in an Internet age? Should knowledge be 'protected' through copyright and other forms of intellectual property rights (IPR)? What is the value of open access to scholarly knowledge? How can Southern African universities improve the visibility and accessibility of their research output?

The articles seek to take the discussions currently occurring within African scholarly and research networks to a broader audience of researchers and scientists, librarians and students, university leadership, government administrators and national policy-makers, as a contribution to the debate on the revitalisation of Africa's universities. While many articles or reviews explore the Southern African context specifically, the article on Copyright and Education looks at a broader sample of African countries, while the article on 'Access to Africa's knowledge' and the CODESRIA review addresses itself to a continental audience.

This volume includes pieces based on studies conducted in the SADC region and on the African continent. It also includes theoretical perspectives, based on an analysis of pertinent discourse and literature, contextualised to Southern Africa and the continent. The review articles provide a brief insight into current thinking and developments on the theme of scholarly communication and open access to knowledge, including perspectives on books and legislation. A number of articles refer to the concepts of 'global south' and 'global north' generally accepted to mean the materially poor underdeveloped countries and the materially rich industrially advanced countries.

Each of these pieces aims to present a novel view of the world of African universities in an Internet age.

In a continent increasingly linked through the Internet and through telecommunications infrastructure, the flow of information and knowledge across national boundaries presents an opportunity to universities, academics, students and researchers to increase the volume, quality and relevance of their knowledge outputs. However, this opportunity may remain 'theoretical' and beyond the reach of many universities in the region, based on a range of challenges in a number of spheres. These challenges include using Internet-based journal publishing platforms and publishing under Open Access licences such as Creative Commons.

Future editions of the journal will focus on other themes in the information society discourse, including eGovernance; ICT policy, regulation and governance; broadcasting and new media; information society development; and other emerging themes in the broad field of ICT, economy and society. ❑

ONE

ACCESS TO AFRICA'S KNOWLEDGE: PUBLISHING DEVELOPMENT RESEARCH AND MEASURING VALUE

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ABSTRACT: This paper reviews, critically, the discourse of research publication policy and the directives of the regional and global organisations that advise African countries with respect to their relevance to African scholarly communication. What emerges is a readiness to use the concepts and language of the public good, making claims for the power of technology to resolve issues of African development. However, when it comes to implementing scholarly publication policies, this vision of technological power and development-focused scientific output is undermined by a reversion to a conservative research culture that relies on competitive systems for valuing and accrediting scholarship, predicated upon the systems and values managed by powerful global commercial publishing consortia.

The result is that the policies put in place to advance African research effectively act as an impediment to ambitions for a revival of a form of scholarship that could drive continental growth. While open access publishing models offer solutions to the marginalisation of African research, the paper argues that what is also needed is a re-evaluation of the values that underpin the recognition of scholarly publishing, to better align with the continent's articulated research goals.

Introduction

In July 2009, UNESCO convened the 29th World Conference on Higher Education under the rubric, *The New Dynamics of Higher Education and Research for Societal Change and Development*. This title was telling in a year in which the world had seen a major meltdown in the global economic system, creating a climate in which the question of higher education's contribution to the public good has become more prominent, in opposition to what the conference programme called 'poles of superior quality' and commercially-based competitive systems of innovation.[1]

This dichotomy was discussed in the trend report prepared for the conference, in which Altbach, Reisberg and Rumley (2009) identified the tension between pressure for research to be commercialised and a countervailing pressure to ensure that research contributes to the public good, as a critical problem facing research development and dissemination. This is a tension, they argued, that is likely to be aggravated by the economic crisis, which could generate the potential for reduction in government support for research, at the same time as there are increased social needs arising from the impact of the recession. In these circumstances, the critically important public good role of higher education, particularly in developing countries, risks being pushed aside by 'the rush for income and prestige', potentially leading to even greater inequalities in the global knowledge divide (Altbach, Reisberg & Rumley, 2009).

A persistent thread in the UNESCO conference programme documentation was the role that information communication technology (ICT) could play in enhancing higher education access for the poorer countries, enabling 'catch-up' and creating knowledge networks in such critical areas as poverty reduction, agriculture and public health. John Daniel,

1 http://www.unesco.org/en/wche2009/sub-themes/learning-research-and-innovation/

President of the Commonwealth of Learning, stressed in his speech the transformative potential of ICTs in enabling 'higher access, higher quality and lower cost all at the same time', drawing attention to the 'insidious link between quality and exclusivity' that prevailed prior to the advent of digital technologies and one that he hinted still persists in higher education thinking (Reddon, 2009).

There was a special session at this conference on higher education in Africa – *Promoting Excellence to Accelerate Africa's Development*. The South African Minister of Higher Education and Training, Blade Nzimande, addressed this session on behalf of the Conference of Ministers of the African Union. He opened his speech with a powerful statement on the persistence of the global knowledge divide. What was interesting is that he cast this statement, not in the way that this problem is most often addressed, as one of access to world knowledge by African researchers, but as a failure in the dissemination of and access to African research in Africa and in the world:

> *Although progress has been made in HE provision in Africa, it is obvious that over the last few decades some things have not changed. There has been no significant break in relations of knowledge production between the colonial and post-colonial eras. African universities are essentially consumers of knowledge produced in developed countries. In essence, what is being defined as 'knowledge society' means two different things to the developed world and the African continent. The former are the producers and the latter are the consumers of knowledge, which seriously undermines the fostering of the multicultural nature of Higher Education, as virtually all partnerships are one-sided.*
>
> *This is not only negative for the African continent, but it also deprives global higher education of access to the indigenous knowledge of Africa, and it deprives Africans of the opportunity to develop their indigenous knowledge system and strengthen their relationship to western and eastern knowledge systems.*[2]

The Namibian Prime Minister, Nahas Angula, followed up with a plea for the need to reconfigure the application of research in order for it to impact on the problems that African citizens face, asking: 'How could the application of knowledge end poverty and hunger in Africa? How could higher education empower women and promote gender equity? How can knowledge be considered in the African context to address child mortality and improve maternal health? (Reddon, 2009).

Nzimande's perception of an unchanging neo-colonial knowledge dispensation and Angula's concerns about the application of research to Africa's pressing problems are both very cogent, at a time when African higher education is trying to re-establish its prestige and importance, after decades of neglect. This neglect was the result of a combination of political and economic turbulence and World Bank policies favouring primary education rather than higher education as the most effective route to national development (Bloom, Canning & Chan, 2005). A global recession now complicates these issues further. On the other hand, the deep negative effect of the recession helps draw attention to the failures of global, liberal economic theories. As a result, there is an emerging need to redefine the values that underpin recognition and reward systems for universities, their researchers and their outputs, and to align them with public good goals.

2 The text of the speech can be found at http://www.education.gov.za/dynamic/dynamic.aspx?pageid=306&id=8720

With the importance of African research production now high on the agenda of regional organisations, such as the African Union (AU), the New Partnership for Africa's Development (NEPAD), and the Southern African Regional University Association (SARUA), the questions raised at the 2009 UNESCO conference provide a cogent outline of the issues that are problematic for African research publication. The questions that need to be asked are: Why is there continuing marginalisation of African research publication, to the detriment of the development goals targeted by higher education policy? And what are the reasons for the persistence of a commercially-driven, neo-colonial scholarly publishing culture that continues to be subscribed to by African countries? Is African research policy creating an enabling environment for ICT to be effectively harnessed to ensure maximum access to relevant and high quality African research, at the lowest possible cost, as Sir John Daniel envisaged? And what choices are being made between the competitive, commercially-driven systems of scholarly prestige and the need for research to address the public good?

What is certain is that African research publication has fared badly in terms of the conventional measures of competitive, global publication performance. The most commonly applied standard for measuring the effectiveness of research output and the prestige of scholars and universities is the level of publication of journal articles in the Thomson Reuters ISI Web of Knowledge indexed journals[3] and the citation counts of these articles. In the case of Africa, the figures demonstrate the overwhelming dominance of South Africa, which produces close on 80% of the region's research outputs in the ISI indexes. Moreover, there has been a decline in research outputs from most other countries in Southern Africa in the last decades. In traditional print publication and online provision of both formal publications and informal communications, Africa has fallen behind the rest of the world in its contributions to global scholarship. The output of journal articles published by African authors, and journals and books published in Africa, is very low (Gevers & Mati, 2006; Mouton et al, 2008; Butcher et al, 2008).

The publication of research in this system is overwhelmingly dominated by a few rich countries in the global North. In a study of the performance and ranking of the world's leading science producing countries in the ISI journal indexes, King revealed the top four countries – the USA, the United Kingdom, Germany and Japan – produced 84% of the articles concerned, while at the other end of the scale, 163 other countries accounted for only 2.5% (King, 2004; see also Chan & Costa, 2005; Willinsky, 2006). The only African country reported by King in the list of the top 100 countries ranked in ISI was South Africa and it had just 0.5% of the articles in the combined ISI databases, and 0.15% of the most cited papers (King, 2004; Gevers & Mati, 2006). In 2005, South Africa published 23 journals that were accredited in the ISI. Other African countries fared much worse: Egypt and Kenya at that stage had one journal each (Gevers & Mati, 2006).

When it comes to access to Africa's research outputs across the continent, Nzimande's pessimism is borne out by recent research into access to knowledge in Southern African universities carried out by SARUA. This revealed a high level of consensus among

3 This is a series of listed journals selected as the world's 'core' journals and is designed to exclude the need to subscribe to 'unnecessary or extraneous databases', (http://wokinfo.com/about/whatitis/). There are other citation indexes, such as Elsevier's Scopus, but the ISI Web of Knowledge tends to be the standard for the establishment of scholarly rankings in Africa.

administrators, academics and librarians that research outputs from across the region are simply not accessible or available to Southern African institutions. In fact, one finding was that researchers often did not even know what was being produced in their own institutions. As far as access to African research was concerned, a number of constraints were identified, including a lack of awareness of what is being produced in African countries and the predominance in African research of unpublished research outputs in the form of reports and technical papers, conference proceedings and working papers that were not being curated and were therefore not readily accessible (Abrahams et al, 2008). In other words, a good deal of research that could make the contribution to community development that Angula was seeking, in his speech at the UNESCO conference, is being rendered invisible.

This paper reviews, critically, the discourse of African research publication policy and investigates the reasons for the failure by African researchers, described above, to find a voice in global research publication, either in the formal system of global scholarly publication or in the effective dissemination of development-focused research output. The paper argues that the ambitions of African policy-makers for a higher profile for African research and for development impact from research output are being undermined by continued adherence to a 'traditional' publishing system that could be held guilty of the neo-colonial attitudes that Nzimande complained of. This publishing environment depends upon a proprietary copyright system and a value system that places publication in the global North at the top of the hierarchy and publication in Africa at the bottom (Gray, 2007; Abrahams et al, 2008). The result has been to entrench value and reward systems for the recognition of scholarly achievement (at the level of universities and individual researchers) which, this paper argues, effectively undermines the potential for African research publication to raise its profile and to contribute to the public good.

Perspective on research policy discourse

The formulation of policy for the revival of African research from the 1990s onwards is to be found principally in reports produced by international agencies, such as UNESCO and the World Bank (Bloom et al, 2005; UNESCO, 2005), African continental organisations (NEPAD, 2006a and 2006b) and post-apartheid South African policy formulation (Gray, 2008). In these documents there is a readiness to use the concepts and language of the public good, in particular making claims for the transformative potential of the technology revolution. This particular strand in the policy literature is forward-looking, acknowledging the changes that are being brought about by Internet communications. This is usually framed as a recognition of the importance of participation in the knowledge economy or the networked knowledge society.[4] A typical example from South Africa's White Paper on Science and Technology (DACST, 1996) sees this technological shift in communications media as a way for research to reach into the community:

> *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 .... [t]he ability to maximise*

4 Although these terms are often conflated in the policy literature, they are separate and different concepts: the knowledge economy refers to a perception of the importance of knowledge in the production of wealth, while concepts of the knowledge society deal with the role of the Internet in a world of decentralised and collaborative communications.

> *the use of information is now considered to be 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.*

In a similar vein, UNESCO's report *Towards Knowledge Societies*, stresses the need for shared knowledge and knowledge diversity in the networked world, with major benefits of developing societies and the creation of 'a human, sustainable and shared development' (UNESCO 2005:145). Yet, the empowering vision articulated in these statements has remained elusive for African scholarly researchers. It has not resulted in increased reach, nor in increased impact for their publications. What is also striking in this statement – and others like it – is a conflation of the commercially-driven ethos of the knowledge economy, which the White Paper correctly perceives to be a competitive system of rankings of excellence, with the empowering potential of the networked knowledge society. The latter, Guédon points out, is more than just a historical phase in knowledge development, but is also creating a more emancipated political dispensation (Guédon, 2008), a point that Benkler endorses in his analysis of the human rights potential of the networked knowledge society (Benkler, 2003b).

When it comes to implementing scholarly publication policies in Africa that could help reverse the digital divide, this vision of the potential of technology to deliver development-focused scientific output is undermined by a reversion to a conservative understanding of what constitutes scholarly publication. The latter relies on a narrow vision of the range of scholarly publication – journal articles and scholarly books – and on a reliance on competitive metrics for valuing and accrediting scholarship, predicated upon the journal indexes and citation systems managed by powerful global commercial publishing companies (Guédon, 2001 and 2007). This is exactly the competitive innovation culture and 'poles of superior quality' warned against in the 2009 UNESCO conference documentation, described at the outset of this paper. In this regard, there is a puzzling circularity in a number of policy documents, in which enlightened discussion of the potential of a new and more democratic knowledge society concludes with recommendations for the implementation of benchmarks for evaluating scholarly performance that depend upon numerical counts of copyrights and patents. In this discourse, which is seldom interrogated, 'research outputs' appear to mean journal articles, scholarly books and patents.

Untangling the different strands of the policy discourse of research communications in Africa is made more difficult by the fact that the policy initiatives for the revival of African scholarship have taken place over a decade and a half of rapidly shifting global research communications. New technologies have impacted on the way research is conducted and this, in turn, has produced changes in scholarly communication products. One result has been a growth in informal and open communications, including reviews, pre-prints and working papers, data, blogs, and discussion forums (Maron & Kirby-Smith, 2008). Collaborative and inter-disciplinary research has become more important and applied research has gained greater importance (Houghton, Steele & Henty, 2003).

These developments should appeal to the aspirations of African policy-makers for research publication with the potential to address development concerns. The collaborative and open research approaches and the wider range of outputs emerging in a changing research environment offer potential for development impact that cannot be achieved through the

restricted scholar-to-scholar communication offered by journal articles. In fact, a number of African research councils and research centres have, for some time, produced online research and technical reports, policy papers and community-focused resources that are targeted at achieving development impact in fields such as agriculture, poverty relief, public health and community law. However, what tends to happen at government and institutional level is that, when it comes to policy for scholarly publishing, this wider range of communication outputs is sidelined in favour of the pursuit of citation metrics for articles published in international journals as the single measure of successful performance. This appears to be a catch-22 situation. While regional and national policy demands that the universities contribute through their research to social and economic upliftment – and universities are often criticised if they fail to achieve this goal – the publications that would be the most effective means of mediating research results for development impact are disregarded.

This narrow view of what constitutes valid research output ignores the expanded horizon of scholarly communication in the 21st century. It also ignores the potential for expanded conceptions of research communications, in a networked digital world, to address social and development needs, in ways that traditional and formal publication genres have not been able to do. This potential is being recognised in the increasing attention being paid to national and international policies for access to research, and by the adoption of open access licences, and expanded and open research publication programmes, by leading international universities such as Harvard, Stanford, California and MIT (Suber, 2009). Catherine Candee, of the University of California, discussing the university's research publication strategy, saw this as an essential component of a university's role in a digital world (Candee, 2008):

> *In the digital realm, there is no reason to plan to enhance scholar to scholar communication without considering how to improve the knowledge, the creation and scientific output of the university to the public. This is not just for the individual public interest and good - universities must aim to meet the challenges of modern society. How better than to ensure that we have an adequate publication and communication system?*

However, all too often, in African universities, this potential is short-circuited by the persistence of an older publishing system. There is a familiar mechanism at work here: a review of current scholarly publishing models from the US Association of Research Libraries (ARL) describes this reversion to traditional publishing models as a common reflex in a rapidly changing environment:

> *The urge to consider new forms in comparison to the monograph and journal genres that dominate library collections and the consciousness of the Academy is powerful. Yet this frame for interpreting changing practices of scholarly communication carries the risk of falling into a certain circularity of thought - we may acknowledge that scholarly works will change and yet behave as if anything that does not look like a traditional work of scholarship is not a scholarly work; thus the immutability of traditional publishing models becomes axiomatic. Different becomes less by definition* (Maron & Kirby Smith, 2008).

This 'circularity of thought' is what happens repeatedly in development-focused and African research communications policy. And so, for example, NEPAD, with a strongly

developmental vision for African higher education, nevertheless privileges journal publication and patents as principal indicators for the success of the system (NEPAD, 2006a), as does South African policy, with its financial rewards for the publication in 'accredited' and indexed journals. In general, journal articles, particularly in journals in the ISI indexes, are privileged as the single most recognised and rewarded scholarly output. These are for the most part commercial subscription journals with 'all rights reserved' copyright, often with high subscription prices and limited circulation in Africa. The result is a limitation on the extent to which African researchers can create a collaborative base for developmental research relevant to African priorities. This is a result of the bias of the journal publishing indexes against work from the developing world and because of the exclusion of applied research outputs in the hierarchy of what type of publication outputs are recognised and rewarded in most higher education systems. This has the effect of pushing much African research to the periphery.

Hegemony of the big journals and commercial publishers

In a recent critique by Zoe Corbyn on the hegemony of the big journals, published in the *Times Higher Education Review*, Richard Horton, the editor of the *Lancet*, is cited as describing how, if he chose to publish African authors, this might reduce the citation impact of his journal. The most cited articles in medical journals, he argues, are studies of randomised trials from rich countries and if he published African authors, these articles would score fewer citations:

> *The incentive for me is to cut off completely parts of the world that have the biggest health challenges ... citations create a racist culture in journals' decision-making and embody a system that is only about us (in the developed world).* (Corbyn, 2009).

Corbyn's critique and Horton's comment about the implicit racism of journal publishing citation counts are part of a rising tide of criticism that recognises that the indexing systems that underpin the competitive rankings with their claims of 'universal' excellence are neither universal nor some kind of natural good. They are, rather, the product of a closed system, with its own rules of the game, dominated by commercial companies that depend upon the control of intellectual property rights for the commercial exploitation of scholarly publication. This is also an environment with a set of values and interlinking hierarchies, not always acknowledged by the universities that participate in the system, that identifies knowledge that is relevant to the global North as 'universal' (Guédon, 2007); ranks developmental and applied research below basic research, and perceives the public good as best achieved through commercialisation via intellectual property protection and patenting (Gray, 2007).

In reality, the commercial journal publishing empires that underpin this system are of recent date, a product of the growth in the importance and commercial value of science in the 20th century knowledge economy. Responding to the recognition that there were now financial opportunities in the expanding terrain of scientific knowledge production in post-war Europe and the USA, large-scale commercial publishers progressively replaced the learned societies and other small publishers who had until then dominated journal production (Guédon, 2001). In the wake of the massification of higher education in the 1960s and 1970s, these commercial publishers consolidated and progressively took over control of the quality systems for scholarly publishing, using commercial muscle to build dominant

journals that were perceived to be necessary channels for the publication of leading research, to which libraries would have to subscribe. This dominance was facilitated by the application of Bradford's Law, which was developed in 1934 for librarians struggling with budgets during the Great Depression. It was intended as a tool for estimating the diminishing returns of extending a search for references in science journals. This in turn led to Garfield's concept of the 'core science' philosophy that was adopted in what became the hugely influential ISI Science Citation Indexes in the 1960s, now owned by Thomson Reuters.

Not surprisingly, the 'core' journals were progressively acquired by commercial publishers who now own the majority of journals in the journal indexes, with Elsevier alone controlling around 20% of them (Guédon, 2001). The acceptance of the core journal system by governments and university administrations across the English-speaking world has, as Guédon argues, created a situation in which 'a private company … Thomson Scientific – unilaterally, and largely unaccountably, decides how many journal titles will be included in its basic list and everybody else abides by its decision' (Guédon, 2007). Accompanying the rapidly increasing consolidation of publishing, with major journals in the hands of fewer and fewer publishers, have come steeply rising prices. As Houghton reports, from an Australian perspective: 'Between 1986 and 1998, the number of journal subscriptions in Australian university libraries declined by 37%, but expenditure on them increased by 63% and the unit cost of journals increased by a staggering 474%' (Houghton, 2001).

It also needs to be remembered that this knowledge economy commercial publishing model is dependent upon the control of intellectual property rights (IPR) for the generation of profits. It is standard practice for authors of scholarly journal articles to cede copyright to the publisher. This has meant that more and more of the research content produced in the world belongs to large media conglomerates in the global North which have a vested interest in advancing increased enclosure of IPR. The high price of international journals makes it difficult for even the richest universities in the global North to afford subscriptions to the full range of scholarly journals (Schieber, 2008), let alone African libraries. This effectively cuts African researchers off from access to research developments and debates in crucial areas such as health and agriculture. In the 75 poorest countries, 56% of institutions have no subscriptions at all to medical journals (Chan et al, 2009).

The creation of these commercial publishing empires has pushed developing countries – defined in this system as 'peripheral' and 'local' and unable to afford the subscription costs to these journals – even further to the margins in an already unequal global knowledge system. When the ISI deliberated the presence of publications from Third World countries in the index in 1982, the decision was to evaluate only their 'contribution to world science', rather than (also) including work on matters of 'merely' national or regional significance (Guédon, 2007).

In these circumstances, African publications – at best perceived as marginal – have practically no chance of being taken up by international institutional subscribers, in either print or electronic format. African scholars – and scholars from other parts of the developing world – equally have limited chances of having their articles published in the indexed journals. The bias of the Thomson Scientific and IBSS journal databases is clearest in those places where knowledge is most likely to be regional. Steele, Butler and Kingsley (2006) make it clear that there are specific subject areas that suffer from a lack of coverage

as a result. Much of the social science and humanities research carried out in African countries has, by its very nature, a national or even regional focus, and is likely to be of interest to other developing countries, rather than the global North, which means that literature relating to these disciplines is unlikely to appear in the international indexes (Gevers & Mati, 2006). Even more damagingly, vitally important research fields are neglected, such as research into diseases that affect millions of people in the poorer parts of the world (now, in an interesting turn of phrase referred to as 'neglected diseases' in forums such as the World Intellectual Property Organisation).

It is interesting to note, however, that in May 2008 Thomson Scientific released a press statement announcing the addition of 700 'regional' journals to their online database 'Web of Science', after two years of evaluating such titles. According to the Thomson Reuters press release,[5] '[t]he newly identified collection contains journals that typically target a regional rather than international audience by approaching subjects from a local perspective or focusing on particular topics of regional interest'. This resulted in the inclusion of 19 more journals from South Africa, one from Nigeria and one from Kenya.[6] While this move is to be welcomed, the language of the announcement still reveals a vision that reflects the view from the global North: the project is designed to provide a regional perspective for the evaluation of research trends and 'builds a bridge between significant regional studies and the global research community'.[7]

This move by Thomson Reuters might well be a response to a rising tide of criticism of the system, the growth of open access publishing, and increasing discussion by the developing world (which makes up more than 80% of the global population) about alternative publishing models and the creation of scholarly indexes that could measure regional and national impact factors. In Latin America, the SciELO consortium is developing scientometric tools for regional scholarship, and China is developing its own citation index (Guédon, 2007). The Academy of Science of South Africa has forged a partnership with SciELO to create SciELO South Africa, a platform for the open access availability of the leading South African journals, tagged according to a SciELO-developed system for measuring regional and national impact.[8]

Fields of promise for access to scholarly communications: Budapest and beyond

The promise of a more democratic knowledge environment has been recognised for a number of years. In 2001, for example, under the auspices of the Open Society, a group of the leading thinkers interested in the potential for change from what was still a relatively new Internet environment, met in Budapest to discuss what this was going to mean for scholars and researchers in the global knowledge society. Their collaboration resulted in the Budapest Open Access Initiative (Soros Foundation, 2001), which has remained the standard statement on this future vision:

> *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,*

5 http://scientific.thomsonreuters.com/press/2008/8455931/

6 http://isiwebofknowledge.com/currentuser_wokhome/wos_jnl_expansion/ma/

7 http://isiwebofknowledge.com/currentuser_wokhome/wos_jnl_expansion/

8 http://www.scielo.org.za

> *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.*[9]

The vision of the public good that emerges in this statement is not simply a matter of ensuring public benefit from taxpayer-funded scholarship, but was underpinned by an understanding of the deeper changes in economic and political systems that would result from the Internet revolution. What the Budapest Initiative argues for is a shift to a vision of the enormous potential offered by the new technologies for collaborative modes of production, of the use of technology for sharing and peer production as a 21st century route to gaining benefit from research.

Underpinning this vision is the recognition that the 20th century knowledge economy, which was built on the importance of the commercial exploitation of knowledge as the key driver of the modern economy, is being challenged by new possibilities for democratic and open global networks for knowledge dissemination in the global networked knowledge society. The Internet in the 21st century offers the potential of radically decentralised participation in communications. Pervasive networked Internet communications, using low-cost processors, allows for non-market production and increased participation by citizens at all levels in the production of value (Benkler, 2003a, 2003b, 2006; Guédon, 2008). As Benkler writes in his seminal book, *The Wealth of Networks*:

> *The change wrought by the 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).

The rise of the knowledge society, therefore, offers the advantages of more democratic values, delivered through collaborative and shared research that are of particular importance to developing countries, especially as they find themselves at a disadvantage in access to technology and information networks in the cut-throat world of the knowledge economy. The concomitant rise of knowledge societies in Africa and the developing world offers opportunities to democratise the production and dissemination of knowledge, away from the domination of the media conglomerates of the global North.

The open access publishing models that have developed in the wake of the Budapest Initiative in the first decade of the 21st century are increasingly being embraced by international organisations, national governments, donor agencies and universities across the world. This is because they offer greater potential for democratic access to information and knowledge and increased research impact on development (Suber, 2009). There have been a number of other declarations, including the 2003 Berlin Declaration on Open Access

9 http://www.soros.org/openaccess/read/shtml

in the Sciences and Humanities,[10] the Bethesda Statement[11] on open access (2003) which focuses on biomedical research, as well as the Salvador Declaration (2005)[12] and the Bangalore Statement[13] (2006), which take a developing-country view.[14] According to the Salvador Declaration, for example:

> *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.*

Open access is perceived in these declarations 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 to create greater efficiencies in research. Their signatories include institutions, organisations and individuals from across the globe. An increasing number of governments, public institutions and donors have developed policies that advocate public access to the research they support and fund. The European Union (EU) has 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: 88–89). This has stimulated intense debate, with the publishing industry lobbying the EU, and academic institutions submitting a petition in support of free access (EU, 2006: 17–19).

A number of research agencies are now asking for open archiving of the research they fund. The National Institutes of Health in the USA has a mandate, enforced by federal law promulgated in 2008, providing for archiving of the research it supports within 12 months of publication and the UK Research Councils ask that funded researchers deposit a copy of their research in an archive. The Australian government's Productivity Commission produced an extensive report in 2007 on commercial and open approaches to science and innovation, with 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).

The Budapest Open Access Initiative defines open access publishing as follows:

> *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*

10 http://oa.mpg.de/openaccess-berlin/berlindeclaration.html

11 http://www.earlham.edu/~peters/fos/bethesda.htm

12 http://www.icml9.org/channel.php?channel=91&content=439&lang=en

13 http://www.ncsi.iisc.ernet.in/OAworkshop2006/pdfs/NationalOAPolicyDCs.pdf

14 A full list of the various open access declarations and statements is provided in the Open Access Directory: http://oad.simmons.edu/oadwiki/Declarations_in_support_of_OA

to give authors control over the integrity of their work and the right to be properly acknowledged and cited (Soros Foundation, 2001).

Exploiting the low cost of online distribution, as Sir John Daniel recommended at the 2009 UNESCO conference, open access publication takes advantage of the potential of new technologies in order to open up the dissemination of scholarly literature to wider audiences, making knowledge available as the foundation for further research and development. Open access online publication allows for the use of research content for educational purposes and some open licences can permit reworking and translation to extend the impact of science to communities of various kinds, in the way that Angula sought in his conference speech. For African countries seeking maximum benefit from their limited resources for research development, this has obvious advantages. Moreover, there is a substantial and growing evidence of the increased impact of open access publication compared to conventional print or digital publishing. Houghton and Sheehan, reviewing the economic effect of enhanced impact from an Australian perspective, cite a number of studies that have demonstrated the open access citation advantage, showing differences between the mean citation rates of open-access articles and articles that are not freely available online. In physics research, this can be from 2 to 5.8 times higher, and it ranges, in other disciplines, from 45% higher in philosophy, and 51% in electronic and electrical engineering, to 86% higher in political science and 91% in mathematics (Houghton & Sheehan, 2006: 4 – citing various sources).

As open access publication has grown, increasing volumes of research are being made available worldwide. Chan, Kirsop and Arunachalam (2009) emphasise the need for this to include knowledge from the developing world. 'Without the input of knowledge from the disadvantaged regions, development initiatives may suffer from inappropriate programmes', they argue, citing as an example tuberculosis vaccine development, which needs to respond to genetically different isolates from different regions. The authors advocate the use of open access archives both in institutional repositories and in international directories such as Bioline International,[15] as a way of raising the visibility of developing-country science. This strategy, as well as the development of open access publications, has worked particularly well in providing access to the research output of transitional economies such as Brazil, China and India, which has increased considerably in the past decade.

Landscape for open access in Africa

As far as Africa is concerned, there is an opportunity to build on existing initiatives. There are a growing number of archives and repositories of scholarly content on the continent – there are now 30 repositories in Africa listed in the Open Doar directory.[16] The African Academies of Science are promoting the development of open access models for African research publication; the South African Academy is in the lead with a programme in partnership with SciELO in Brazil for the building of a scholarly journal platform. CODESRIA, the pan-African social science research organisation, publishes a number of open access

15 Bioline International is a not-for-profit organisation that provides open access for quality research journals from developing countries http://www.bioline.org.br

16 http://www.opendoar.org

journals and books. Perhaps the most notable example of successful, development-focused, open access research publishing on the continent, however, is the Human Sciences Research Council (HSRC) in South Africa. The HSRC Press, which operates a dual stream, open access online and print publishing model, has achieved exposure for its publications worldwide, with high levels of downloads. Its publications have become the first option for scholars and policy-makers seeking information on social science research in southern Africa and the quality of its publications is widely recognised.[17]

However, if African governments and universities are to take full advantage of the benefits offered by open access publication, attention must be paid to the values that currently underpin scholarly publishing policies, and a better alignment should be sought with the continent's strategic goals. Building on the idea of the creation of measurements of value that could better reflect Africa's concerns and making the most of the potential of ICT for the creation of open online research resources, Africa could achieve the value that arises from collaborative and participative research. Such approaches could reduce the barriers that currently limit access to the knowledge generated on the continent and maximise the potential for African research to impact on the public good.

Conclusion

As African organisations have sought to revitalise the continent's research infrastructure, the two most common themes have been the need for research to contribute to development and the need for the quality of African research to achieve global recognition. When it comes to the publication of African research, this paper has argued that the imperatives of global competitiveness have been dominant, expressed as a desire for African research to be published in 'mainstream' journals, of 'global' quality. This search for excellence, as Guédon argued at an African scholarly publishing workshop in Cape Town in July 2009,[18] needs to be distinguished from the search for quality. Excellence is not just very good quality, he suggested. The concept of excellence is a matter of competition, with specifically defined parameters creating the rules of the game in which this competition is played out. It is a system for creating hierarchy. In the case of scholarly publishing, the rules of the game determined by the large multinational publishers favour the global North over the developing world and the values of the knowledge economy over the more developmental values of the knowledge society.

These ideas are beginning to be taken up in Africa and worldwide. Nzimande, for example, has suggested that social impact and not citation metrics should be the basis for the measurement of research excellence:

> *Our universities, in particular, should be directing their research focus to address the development and social needs of our communities. The impact of their research should be measured by how much difference it makes to the needs of our communities, rather than by just how many international citations researchers receive in their publications. Therefore, in awarding excellence in research due consideration should be given to how much change has happened as a result of research from our institutions of higher learning, including improving the living conditions of the majority of our people, most of whom are women.*[19]

17 http://www.hsrcpress.ac.za

18 This was a workshop to frame the scoping of a project for the development of African scholarly publishing, convened by the International Development Research Centre and the Shuttleworth Foundation.

19 Speech to the Women in Science Awards, Johannesburg, 21 August 2009.

On the global front, the award of a Nobel Prize to Elinor Ostrum is an indication of greater attention being paid to social, moral and political values in the world than to economics alone and to the commons rather than to rivalrous resources (Bollier, 2009). In this period of economic crisis, Amartya Sen's arguments for the measurement of human freedoms and capabilities rather than only economic factors are becoming more pervasive (Sen, 1999). The affordance of digital research communications and the values of the networked knowledge society should provide space for African universities to review their scholarly publishing policies and practices, in order to better reflect both the need to achieve research excellence and quality standards for development-focused research. ❑

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Two

RESEARCH PRODUCTIVITY-VISIBILITY-ACCESSIBILITY AND SCHOLARLY COMMUNICATION IN SOUTHERN AFRICAN UNIVERSITIES

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ABSTRACT: The project for the revitalisation of Southern Africa's higher education sector is dependent on, among other things, the capacity of the region's universities to produce research, to communicate that research to a broad public audience and to use the research output in the process of educating future generations of graduates. Given this context, research output in the great majority of Southern African universities is barely visible. While the introduction of new digital media may offer greater accessibility and expanded opportunities for the visibility of scholarly communication, this may be insufficient to meet the needs of the many scholars and other actors who seek to build on existing bodies of knowledge, whether to advance society or in order to create knowledge for its own sake. This article reports the findings of two 2008 studies – *The state of public science in the SADC region* and *Opening access to knowledge in Southern African universities*. Working within a frame which understands knowledge produced in universities as a public good, this article examines the issues at play in terms of the productivity-visibility-accessibility of scholarly communications in regional higher education. The conclusion discusses a possible approach to improve such productivity-visibility-accessibility, through the adoption of a strategic vision of open access to knowledge and through consideration of two breakthroughs pertinent to achieving a vision of revitalised higher education in the region.

Revitalisation of scholarly communication in the subcontinent

After more than a decade of existence of the open access movement, scholarly publishing in Southern Africa has nevertheless remained rudimentary for a great number of reasons. In many parts of the world, universities operate at the cusp of the information society, as knowledge and information exchange among students, academics and researchers define the business of the university. African universities are emerging from a period of sustained neglect over several decades, during which they operated with limited resources to advance their mission and experienced limited academic freedoms within the context of the region's various political dispensations. Assie-Lumumba (2005) points to the historical failure to invest in research facilities and dissemination channels. Investment in electronic networks, and the changes in research and scholarly communications practice that are set in motion by the introduction of these networks, has been slow to take root on the continent. But initiatives such as the African Union's plan of action on the Second Decade of Education for Africa 2006 – 2015 recognise the 'link between high-level human resources, knowledge production and sustainable development' (African Union, 2006). This plan prioritised the promotion of original knowledge production, quality assurance and advocacy for increased funding. The 10-year partnership programme on Renewing the African University,[1] provided further

1 A partnership constituted by the Association of Commonwealth Universities, the Association of African Universities and the South African University Vice Chancellors Association, now Higher Education South Africa.

impetus for renewal, based on the belief that universities 'must be at the heart of any sustainable effort to rebuild the continent' (Association of African Universities, no date).

Initiatives for institutional change are beginning to permeate Southern African universities, with the main goals being student access and success, quality in higher education, research and engagement with the country and regional context. These goals are connected, in different ways, to the accessibility of the knowledge that may be present, though not visible, within the universities. The value of electronic media as enabling platforms for the greater flow of knowledge is also recognised (SARUA, 2009: 26-27).

Among a number of recent studies on universities in the Southern African Development Community (SADC) region,[2] prepared for the Southern African Regional Universities Association (SARUA), two studies in particular examined issues relating to the strengths and weaknesses of research and scholarly communication. The study on *The state of public science in the SADC region* (Mouton et al, 2008) discusses the 'de-institutionalisation' of scientific production, the limited visibility of regional scientific knowledge in the global pool of academic journals, the quality of local journals and the constraints on the publishing of scientific research from the region. The study on *Opening access to knowledge in Southern African universities* (Abrahams, Burke, Gray & Rens, 2008) explores the constraints on research availability and perceptions of open access within the region's universities. When exploring the data from these studies, it is apparent that visibility and accessibility are worthy of examination from the perspective of a region characterised by low research productivity.

This article, therefore, reports on the findings of the two studies and examines the issues of productivity-visibility-accessibility in Southern African knowledge production at the beginning of the 21st century. It posits a response to the lack of improvement in research visibility and to the rigidity of the scholarly publishing system by presenting an open knowledge platform for scholarly communication. This strategic, conceptual platform seeks to inform the emerging discourse and practice on research productivity in the region, with a view to fostering the greater abundance of and greater access to published knowledge.

Southern Africa – economy and development

Southern Africa's economy had a combined GDP of US$483 325 million[3] in 2008 (African Development Bank, 2009a: 41), low relative to other regions of the world. The region's economy is dominated by the services sector, except for Angola, which has significant mining and small-scale industry, and Malawi and Tanzania, which have high shares of both services and agriculture (African Development Bank, 2009b: 44). Challenges facing the countries of Southern Africa, often common concerns, are poverty, threats to food security, high HIV prevalence, and high rates of tuberculosis (TB) and malaria. Southern Africa had the highest incidence of TB in the world in 2005, with nine countries listed among the 15 countries with the highest incidence (ibid: 2). This regional context is characterised by the need to increase the size and complexity of the region's productive output and by the need for local knowledge to address the many issues in population development beyond those mentioned above. Selected development statistics (Table 1) show a region with relatively small populations, low gross

2 The SADC region includes 15 countries, namely Angola, Botswana, the Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. Madagascar was suspended from the regional economic body in March 2009 for an unconstitutional change of government.

3 No data available for Zimbabwe for 2008.

national income per capita and low life expectancy at birth, suggesting the many hurdles to development that the countries, and therefore also their university populations, confront.

Table 1: SADC development statistics by country

	Mid-year population estimate 2008 (millions)	Largest city	Population in largest city (millions)	Gross national income (GNI) per capita 2007 (USD)	Life expectancy at birth
Angola	17.5	Luanda	4.0	2560	43.1
Botswana	1.9	Gaborone	0.224	5840	51.0
Congo (DRC)	64.7	Kinshasa	7.8	140	46.8
Lesotho	2.0	Maseru	0.210	1 000	43.0
Madagascar	20.2	Antananarivo	1.6	320	59.8
Malawi	14.2	Lilongwe	0.732	250	48.7
Mauritius	1.2	Port Louis	0.150	5 450	73.0
Mozambique	21.8	Maputo	1.4	320	42.4
Namibia	2.1	Windhoek	0.313	3 360	52.9
Seychelles	0.087	Victoria	-	8 960	73.1
South Africa	48.8	Johannesburg	3.4	5 760	49.5
Swaziland	1.1	Mbabane	0.078	2 580	39.7
Tanzania	41.4	Dar es Salaam	2.9	400	52.9
Zambia	12.1	Lusaka	1.3	800	42.8
Zimbabwe	13.4	Harare	1.5	340	44.3

Source: *African Development Bank, 2009b: 26, 50, 40, 31*

Based on the above statistics, the following country groupings can be presented with respect to population size and level of development:

- Group A: Angola, Congo (DRC), Madagascar, Mozambique, Tanzania – large, widely distributed populations with significant rural footprint; low or very low GNI per capita; average life expectancy; few higher education institutions (HEIs)
- Group B: South Africa – large population, widely distributed but highly urbanised, high GNI per capita, average life expectancy, 23 public universities and a large number of higher and further education institutions
- Group C: Botswana, Mauritius, Namibia, Seychelles – small populations, medium to high GNI per capita, average to high life expectancy, few HEIs
- Group D: Lesotho, Malawi, Swaziland, Zambia, Zimbabwe – small to medium population size, large rural populations, generally low GNI per capita, few HEIs

Except for South Africa, the remaining countries of Southern African all exhibit low levels of research visibility at both local and global levels. South Africa, too, has mixed fortunes in that some universities are research productive, while many are severely under-resourced from the perspective of research infrastructure and funding. Here, it would appear, low visibility is primarily a function of low research productivity in general. For these reasons, Southern Africa's universities struggle to meet their obligations as contributors to regional development, through creating and disseminating locally produced knowledge.

The value of visibility and accessibility of scholarly communication in Southern Africa

A starting point for this analysis is to frame the meaning of visibility of and access to scholarly communication as regards the social and economic value of this visibility and accessibility to the region. Visibility is comprised of a number of features including visibility of authors and content through abstracting and indexing databases, through availability in library collections, through web-based publishing, and visibility of research performance as measured through various bibliometric measures such as citation counts and impact factors. Visibility of scholarly communication means that specific knowledge and authored works can be discovered because they are traceable. More importantly, in this regional context, visibility means that research on subjects and themes of local interest should be made public in ways that will enable the relevant actors (researchers, students and development practitioners) to easily identify local research that can be a valuable contribution to society, whether for future knowledge production or for development practice.

The study on *The state of public science* conceptualises visibility, in a bibliometric paradigm, as international visibility, using the numbers of publications in the Thomson-ISI (now Thomson Reuters Web of Science) and Medline databases. The Web of Science currently indexes articles across the world in over 10 000 journals in all fields of science. As the original bibliometric database, it is regarded by most scholars as the benchmark for international visibility. Journals are selected for inclusion in the Web of Science on the basis of their visibility (measured by number of citations per paper) in their respective fields.

Accessibility means that potential users can gain access to the hard copy or electronic format of the research, in order to evaluate the work through a review of the abstract, or through engagement with the full text or content of the work. If the technological means for access exists (both on the publisher's side and on the user's side) and the copyright constraints to access are addressed, then most, but not all, the requirements for access are met. This is generally applicable in regions of high research productivity (Chan, 2004). It is argued here, however, that, in a region of low research productivity, low visibility of Southern African research in the vast pool of global literature on any particular subject may indeed negatively influence its accessibility.

The value generated from higher education encompasses the creation and socialisation of new knowledge in the broad public interest, compared with the private sector where the commercialisation of knowledge is the dominant form of value creation. While research-intensive universities have begun to adopt commercialisation models (Etzkowitz, 2002), socialisation remains the dominant mode of knowledge dissemination (UN Millenium Project, 2005: 88-99), though doubt has been expressed about the public interest nature of much research output (Garnham, 2002). Benkler (2006: 31–32) attributes changes in the processes of knowledge and cultural production and exchange to the greater flows of knowledge throughout society in this Internet age, since 'the capacity to make meaning—to encode and decode humanly meaningful statements—and the capacity to communicate one's meaning around the world, are held by, or readily available to, at least many hundreds of millions of users around the globe' (ibid, 33). A renewed interest in scientific research among younger generations of students and academics is being generated by the greater availability of research made accessible through digital media: 'Science, or building of shared objective knowledge about the world, is a collective human endeavour, and the advent of the connected cyberworld has emphasized this more forcefully than

ever before (ASSAf, 2006: 81)'. These changing conditions of communication and dissemination are enabling the emergence of new social and economic practices of knowledge production and sharing, not only in society at large, but also in higher education. For example, digital libraries, institutional research repositories and online journal publishing are changing the practices of research access and usage within academic, epistemic communities.

Why are visibility and accessibility of scholarly research important to Southern Africa?

Greater visibility is important in order to raise the level of awareness of problems under research investigation, the applicable methodologies being used, the data collected and analysis derived, as well as the presentation of ideas for addressing these problems with respect to their relevance to Southern Africa. Greater accessibility of research, through evaluating analytical perspectives which offer fresh or distinctive views, can fuel the utilisation of knowledge for social and economic development and offer return on investment in scholarly research. The relationship between visibility and accessibility is an important theme in discussions on scholarly communication (Chan, 2004; Halliday, 2001; Kling & Covi, 1995). Chan (2004: 279) argues that:

> *Authors who contribute freely to academic journals do not expect any monetary return for their writing. Authors also perform peer review as part of their professional obligation and contribution to their disciplines. In exchange, they wish their papers to be widely circulated, read, cited, and built upon. This process in turn generates further research questions and funding proposals, and increases the impact of the research. Limiting access leads to lower visibility and needless loss of research impact for the researchers.*

In a context where there is a high volume of scholarly publishing and competition for visibility, lack of accessibility to scholarly works is a barrier to greater visibility and to research impact, including future productivity and utilisation. However, in countries where the volume of scholarly research and publishing is very low, such as in the countries of Southern Africa, what is published is marginally visible, compared to the greater visibility of northern authors and northern journals. For example, students, researchers and practitioners are likely to cite and utilise authored works from abroad over work from the region because of high versus low visibility in particular areas of study, such as in genetics, education and environmental engineering, where regional research output is particularly low. Thus, low visibility and low accessibility are major factors in slowing down research production on the sub-continent, thus limiting the application of knowledge for development purposes.

Here, access to information infrastructure is not the only barrier to dissemination and access to knowledge. Rather, the low levels of published research, whatever form it takes, is a barrier to the process of generating future research questions, generating funding proposals and achieving impact. Even with advanced infrastructure, little research would be available for discovery through abstracting and indexing databases, in library collections or on the Web, given the general lack of availability of the services required for web-based publishing, though this situation is beginning to change.

Initiatives are being undertaken to develop electronic networks among libraries in the region,

4 International Network for the Availability of Scientific Publications

5 Electronic Information for Libraries Direct Project

for example, the INASP[4] and eIFL[5] projects (Ojedokun & Lumande, 2005), in order to encourage the flow of university-produced knowledge across the region. The work of INASP, which was established in 1992 by the International Council for Science (ICSU), is focused on building the capacity to create, manage and communicate scholarly information and knowledge through national, regional and international networks. Through its programmes, INASP facilitates affordable access to international scholarly literature, publishing and creating digital libraries, including in several Southern African countries – Angola, Mozambique, Zambia, Zimbabwe.

Authored works often have low visibility in the academic fraternity because of the form they take, such as consultancy research and research in non-peer reviewed publications (Mouton, 2007; Abrahams et al, 2008). eIFL.net provides support for making available electronic resources to library users in developing countries through programmes that negotiate affordable access to commercially available journals and electronic library resources and through capacity building in areas such as open access publishing and building institutional repositories for research. *The South African Journal of Science* has become the first high profile journal to join the Brazil-South Africa Scientific Electronic Online Library (SciELO) initiative, which aims to make 35 internationally accredited journals freely available by the end of 2009.[6] The University of Pretoria has a policy for mandatory submission of accredited journal articles by its staff to its institutional repository, and voluntary submission of other research output by academics, students and affiliates, all of which are hosted online, giving the output of a single institution greater visibility than before.

Drawing on the discussion above, we construct a rough conceptual framework from which to explore the challenges of productivity, visibility and accessibility:

- **Proposition A:** Knowledge is a non-rival[7] public good (Benkler, 2006; Stiglitz, 1999) and the socialisation of knowledge should aim to enrich society at large and reduce social exclusion. Therefore, a culture of knowledge sharing should be encouraged as a means to increasing research productivity.
- **Proposition B:** As knowledge producers, universities should aim for scholarly communication to 'weigh in' on the side of the socialisation of knowledge for community and country development (Castells, 1999). This should emerge as the main objective of making local, university-based research visible.
- **Proposition C:** New media and new scholarly communication practices are producing beneficial change in the socialisation of knowledge (Houghton, 2006; Nentwich, 2003) and the 'wealth of networks' (Benkler, 2006) can be tapped into to promote the accessibility and rapid distribution of knowledge to a very wide audience.

Encouraging the socialisation of knowledge from research in knowledge-poor developing countries is a necessary ingredient, among many interventions aiming at the revitalising the role of African higher education in society. The challenge for Southern Africa's universities is (a) to raise research productivity, (b) to raise the 'capacity of the whole society to be educated, and be able to assimilate and process complex information' (Castells, 1999: 3-4), (c) to set a public interest research agenda for university-based knowledge production, and (d) to adopt

6 See http://www.scielo.org.za

7 The utilisation of knowledge by one person is not devalued by the utilisation of the same knowledge by any number of other people.

new modes and technologies of academic production and socialisation that enable scholars to make visible and accessible existing bodies of research, both published and unpublished, as required for continuous knowledge production (Houghton & Sheehan, 2006).

Methodology

We present two questions for consideration that were either explicitly or implicitly posed by the two SARUA studies, namely:

(1) What are the barriers to productivity-visibility-accessibility of scholarly communication in the process of the revitalisation of higher education in the electronic age?
(2) What approaches to improving productivity-visibility-accessibility are appropriate for Southern African universities?

The objective of the analysis in this article is to offer an understanding of the state of productivity, visibility and accessibility for the actors involved in the project of revitalising university-based research and scholarly communication. This may enable policy-makers and decision-makers to develop approaches that promote both visibility and accessibility as a means to increasing knowledge production and dissemination.

The study on the state of public science in the SADC region involved a mixed-methodological approach that included a review of historical studies on regional research, a web-based survey of top scientists in the region (n = 634), field visits to 10 countries and a bibliometric study of scientific output from the region. The bibliometric analysis was done on papers published in the journals of the Web of Science (ISI) and journals published by Medline. More specifically, the bibliometric analysis was based on data in Africa Knowledgebase, a database developed by CREST.[8] Data in this database are extracted from various sources, including the Web of Science (ISI), Medline and African Journals Online (AJOL) and contain information on articles produced by SADC researchers as from 1990. The discussion of the visibility of science in the region in this paper is based mainly on these bibliometric analyses. Relevant questions from the web-based survey reported on here relate to (a) the preference of local researchers in relation to publishing in local and/or foreign[9] journals and (b) the reasons for publishing preferences in foreign journals.

For the accessibility study, 89 semi-structured qualitative interviews were conducted. Respondents were drawn from university management and from researchers and academics in the health and life sciences, natural sciences and engineering, and the humanities and social sciences across eight universities in seven SADC countries. Thematic analysis was employed to analyse the transcribed interviews, for which a coding structure was developed pertaining to constraints to accessibility of scholarly communication, as well as knowledge of and interest in open access approaches.

The analytical approach for this paper is to evaluate the findings of the two studies that are related to the productivity-visibility-accessibility nexus. This is in order to explore the issues of visibility and accessibility from the perspective of the actions necessary for revitalising scholarly communication in the region.

Findings on productivity-visibility: State of public science in Southern Africa

8 Centre for Research on Science and Technology
9 Journals not published in the SADC region.

There has been a steady decline in Africa's share of world science as measured in papers published in ISI-indexes over the last two decades (Gaillard, Krishna & Waast, 1997; Tijssen, 2007), while the decline in sub-Saharan science has been dramatic, increasing marginally between 1980 and 1987 and slowing from around 1.0% in 1987 to 0.7% in 1996 through 2004 (Mouton & Waast, 2008). Recent analysis of SADC articles included in the citation databases of the ISI Web of Science, Medline and AJOL journals, in the study on *The state of public science*, confirms the picture painted by Tijssen (Mouton et al, 2008: 47-48). Total output for the 14 SADC countries in the study[10] for the period 1990 – 2007 was 95 711 papers. Table 2 lists the detailed output by country in alphabetical order. The dominance of South Africa in the region is reflected in the fact that it has produced nearly 80% of this output, while Tanzania and Zimbabwe produced the next biggest shares of SADC's output over this period. At the other extreme, countries such as Angola, Lesotho, Mauritius, Mozambique, Namibia and Swaziland have produced very small numbers of papers – none of them contributing more than 1% to the overall scientific production.

Table 2: ISI-publications per FTE researchers per six-year window

	FTE researchers	ISI-publications 1990 – 2007	ISI-publications 2002 – 2007	Publications: FTE researchers: six-year window (2002 – 2007)
Angola	167	182	81	0.48
Botswana	265	1 876	948	3.5
Congo (DRC)	2500	1 118	242	0.09
Lesotho	69	192	68	0.98
Madagascar	440	1 315	675	1.5
Malawi	389	2 001	922	2.3
Mauritius	180	621	313	1.7
Mozambique	795	713	366	0.46
Namibia	84	895	423	5.0
Seychelles	-	-	-	-
South Africa	6 329	75 544	29 225	4.6
Swaziland	60	249	93	1.5
Tanzania	1 047	4 815	2 248	2.1
Zambia	263	1 724	696	2.6
Zimbabwe	520	4 466	1 460	2.8

Source: Mouton et al, 2008

Different pictures of research productivity emerge depending on whether ISI-publications output is measured in absolute numbers, as a proportion of total ISI-listed publications, or as a proportion of the full-time equivalent (FTE) researcher population. When viewed from the perspective of absolute numbers, South Africa is the only producer with a relatively tractable degree of visibility. When viewed in proportion to FTE researcher population, however, then Namibia, South Africa (around five ISI-listed publications per FTE researcher over six years), Botswana, Zimbabwe, Zambia, Malawi, Tanzania (more than

10 Seychelles not included in study.

two ISI-listed publications per FTE researcher over six years) can be considered as contributors to the visibility of Southern African research. However, when viewed against the global 'web of science' the visibility of these Southern African research producers is very low, even cumulatively over countries and years.

The dominant fields of scholarly publishing for the SADC countries are public health, environmental and occupational health, tropical medicine, infectious diseases, veterinary sciences, immunology, environmental sciences and plant sciences. Low-production fields include the engineering sciences, medium- and high-technology fields, history and economics. Yet these latter fields are necessary for economic development in the region, not merely for competitiveness in the international journal publication stakes.

Web of Science and Medline journals are not readily available to Southern African universities, either in libraries or on the Internet. Thus academics, researchers and students face a triple bind: (a) low accessibility in relation to academic journals in general; (b) low accessibility to journals from the region; and (c) low accessibility of subject matter relevant to regional development concerns. In addition, researchers experience low research impact due to poor visibility of their output. If the 'visibility of science' and 'accessibility of scientific knowledge' are necessary conditions for growth in knowledge production as well as for functions such as post-graduate training and technology transfer, then the future efforts to codify and publish knowledge in publicly accessible journals, whether local or international, is a major strategic requirement for higher education revitalisation. Only through such codification and publishing can local knowledge be cited, used or applied and therefore add to our body of knowledge.

The web-based survey indicated that the biggest single group of South African respondents (36%) preferred to predominantly publish (but not exclusively so) in foreign journals, with a further 21% saying that they only publish in foreign journals. A greater percentage of SADC respondents indicated that they only publish in foreign journals (27%). In total, 57% of South African (SA) respondents and 47% of respondents from other SADC countries indicated that they prefer publishing predominantly or exclusively in foreign journals. On the other hand, 29% of SA respondents and 40% of respondents from other SADC countries indicated that they publish in both local and foreign journals.

Even though a relatively small number of Southern African journals are indexed in the Web of Science, most scholars agree that it is their aim to publish in these journals. The reasons given by the respondents for their preference to publish in foreign journals includes greater exposure (84%); the research field is of an international nature (78%); superior scholarly quality (76%). These results show that, despite the imperative – which is particularly strong in small and developing science systems – to publish in local journals, the vast majority of respondents prefer to publish in foreign journals for reasons of greater international visibility.

Findings on productivity-accessibility: Constraints to scholarly communication and perspectives on open access

The study *Opening access to knowledge in eight universities*[11] *in Southern Africa* reveals the following dominant features in relation to constraints on scholarly communication: awareness of research and scientific output; availability of research output; concerns about copyright;

11 University of Botswana, University of Dar es Salaam, Eduardo Mondlane University, University of Malawi, University of Mauritius, University of South Africa, University of Pretoria, University of Zambia

capacity for online communication; publishing criteria for promotion and reward; and journal publishing patterns. In addition, views on open access include concerns regarding quality and peer review; fear of plagiarism; recognition of open access research output and capacity for making open access operational.

Awareness and accessibility

Awareness of research output within the respondents' own departments or institutions and in institutions across the Southern African region appears to be limited. There is a preponderance of unpublished research, including conference and advocacy papers, technical and consultancy reports, theses and dissertations ('grey' literature) which is not easily accessible because it is generally not held in university libraries or available online:

> *This local research is also not readily available and accessible to researchers within the institution itself. … Very few researchers submit their publications to the library. More importantly, if those articles are deposited, they are supposed to be organised properly so that they can be easily accessible with good information retrieval tools. This has not been done and therefore it is not easily available* (Librarian).

Views on accessibility as expressed by librarians, university management and senior researchers differed from those expressed by academics and heads of faculties or schools. Librarians were unanimous in the view that Southern African research is not accessible across institutions in the region. This view was largely echoed by university research managers and by senior researchers. Deans and academic teaching staff were more inclined to find research output accessible. This difference is attributed to the differing needs of each group with respect to research output, with teaching staff having a less immediate need for advanced research in a particular field.

Availability and researcher practice

Researchers exhibit unwillingness to publish their work in formats that are not peer-reviewed, such as published research reports or thematic issue papers, limiting the availability of their data, methods, analysis and conclusions to researchers in the same and related fields. Given that the book chapters and journal articles published internationally are not easily accessible from Southern Africa, or are only available at a substantial cost, the lack of access to 'grey literature' further limits the flows of knowledge and novel ideas through the broad scientific community:

> *We have a culture where people don't feel comfortable sharing information even when something has been published. People want to keep information to themselves and that is not easy to get rid of, but it is a constraint* (Senior scientist).

Local investment in research funding is meagre, setting the scene for heightened competition for limited international research funds available for Southern African researchers. This reality, combined with institutional policy which emphasises promotion on the basis of peer-reviewed published work, provides hard motives for the unwillingness of researchers to engage in other, potentially valuable, forms of scholarly communication:

> *There is a limited number of research grants in the university and what happens is that you apply for that grant, backed up by a good proposal. But, the university hasn't got enough of that money so it's a cake which we are sharing between so many. Some proposals*

are shut down, or you keep on refining or finding other research projects. You tend to hold on to your research and ideas in these circumstances (Researcher).

This view was confirmed by a senior manager, positing that researchers are guarded '*for fear that their research might be stolen and used in applications for research grants*' (DVC Research).

Copyright

Among researchers, the assumption that they must gain permission from publishers and must pay to use their own published material appears to be accepted without contest. While respondents were not aware of, or did not understand the options available for retaining access to their intellectual property, universities appeared to have ineffectual processes for managing copyright and intellectual property rights issues in ways that contribute to the greater accessibility of published work:

We are trying to educate researchers that if their articles are accepted, they still have the right to that information pre-final draft. If I send the editor the final copy, I can send it to the repository. That is the loophole. You can have a footnote saying where it will be published as you already have acceptance of it. Their ownership still exists prior to the final draft (DVC Research).

A more forthright response on the effects of copyright practices on accessibility was heard from a librarian: 'Copyright holds academia by the scruff of the neck'.

Capacity to make research output available online

Respondents agreed that the Internet provides a highly effective channel for scholarly communication, but expressed concern that the potential of online dissemination is not yet being realised:

Upcoming academicians don't have avenues where they can disseminate information. … If we had better dissemination, not just journal papers, but also conference papers which can be given to people who do not attend the conferences ... All of these can be put onto a website but they are not there (Dean of Humanities and Social Sciences).

In reality, many universities lack the capacities and skills necessary to operate in the online environment, in addition to the scarcity of funding and technical infrastructure:

One (constraint) is the ability for us to put information on the university website. We have no capacity to do that … (DVC Research).

Journal publishing patterns

The most frequently used publishing media are academic journals and conference proceedings. The objective is to publish in rated international journals, despite the challenges of having an article accepted. This view appears to apply across all disciplines. A large proportion of respondents emphasised the difficulties and challenges:

To publish internationally is always a problem. Our papers are of a high quality but it is not always accepted. It helps if you do (collaborative) research with international known researchers, then it becomes easier to get your papers published (Researcher in Science and Engineering).

Many views seem to militate against publishing, such as the view that the problem-solving focus of much (African) research is not suitable for publication in northern journals; or the view of perceived bias against African knowledge by the northern scientific community:

> *The definition of international journals must be redefined as it currently does not include African journals* (Dean, Humanities and Social Sciences).

This latter bias is seen to be entrenched by African researchers themselves, as expressed here:

> *Yes, but it (your research) must be accredited and validated. You need something that is internationally validated and this is a problem with local non-accredited publications. How valid is the research? ... We have to internationally validate ourselves* (Researcher, Health and Life Sciences).

and

> *Our researchers prefer to publish in other journals, as the* Malawian Medical Journal *is a small local journal and people think it is of a lesser standard in terms of acceptance to the wider community* (Respondent, Health and Life Sciences).

There is some merit to the range of concerns expressed, when the challenges of publishing in local journals is considered. Concerns include lack of regularity of journals, perceptions of poor quality, and the problems associated with the availability of a relatively small pool of experienced peer reviewers and editors. Lack of accessibility of journals published in the region was raised as a major constraint.

Quality and peer review

Respondents were concerned that open access material would not be of good academic quality, particularly when not peer reviewed. The assurance of the peer review process appears to influence the willingness of many respondents to support open access, as this provides a basis for validation of the work:

> *It should be open but with responsibility and therein lies the problem in that you could get … information that is inaccurate. The fear in the academic world is in how you distinguish between valid, useful information and that which is not valid* (Dean, Health and Life Sciences).

Recognition of open access research output

Respondents confirmed that promotion and reward policies are skewed towards recognition based on publishing in international journals, rather than on recognition of the academic value of creating open access to local research:

> *We are generally better at producing regulations for dissemination than we are at producing regulations for access. We have regulations telling people where, how and even what to publish but the conditions as it stands, constrains access* (DVC Research).

Analysis and conclusion: research productivity–visibility–accessibility and revitalisation

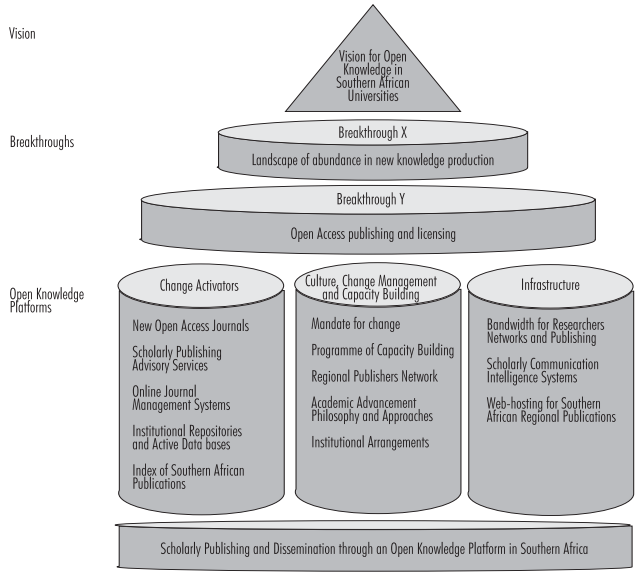
The advancement of knowledge is a contributing factor to social and economic development in all societies, not least in countries with low GDP and major development challenges, such as the countries of the SADC region. The studies on the *State of Public Science in the SADC Region* and *Opening Access to Knowledge in Southern African Universities* can be used to gain an enhanced understanding of issues at play in the productivity-visibility-accessibility of research produced in the region. Evidence shows that research is produced, but the recorded level of scholarly communication in formats that have high visibility is low. Furthermore, grey literature, including unpublished research reports, is poorly represented online and its existence is poorly documented. This combination of low productivity, along with low visibility of and low accessibility to what is produced, places Southern Africa in a downward spiral as regards cycles of research productivity.

Emerging approaches to the socialisation of Southern African knowledge must address all three elements, making research output visible and accessible across a broader range of communication forms and channels than the 20th century mode, which has been dominated by the publishing industry in the global north. Scientists, scholars and students can, through the medium of the Internet, publish their own work, without recourse to the publishing industry as intermediary. They can do this while still maintaining the requisite standards of academic quality in research communication, through online management of peer review and other quality assurance processes. This is important to Southern African universities, where the tradition of university publishing is very limited and where the region historically lacks a research publishing services base.

The perception that (Southern) African research is not sufficiently valuable to be made visible, except for individual career progression, is akin to a 'death wish' for scholarly communications. Furthermore, low visibility and accessibility have a mutually reinforcing effect, explaining the downward spiral observed in the visibility study. Yet what is currently visible does not fully describe the patterns of research output in Southern Africa. It is not possible to build greater visibility or accessibility without changing the paradigm about what is valued and therefore what is made visible and where. Funding the tip of the research production iceberg, where Southern Africa does not yet compete, makes accessibility a continued challenge. The lack of funding for access to scholarly communication using electronic channels presents a further constraint to increasing visibility, because there is so small and fragmented a public knowledge base on which to build. A sea-change in national and institutional thinking and policy on the resourcing of research is sorely needed.

It has been argued that the system does not produce sufficient output (research and successive generations of researchers) to reproduce itself. The system is seen to be in 'subsistence mode', with the majority of universities barely able to reproduce themselves as viable knowledge producing institutions (Mouton et al, 2008). Many researchers demonstrate exceptional performance; however, individual scientific endeavour rarely converts into building institutional research capacity which is cumulative over time and which can act as a platform for future research and post-graduate training.

If universities are to reproduce and revitalise themselves, what do they need to invest in and what changes should be introduced in institutional and national policy?



(Abrahams, L & Burke, M, in Abrahams et al, 2008)

DIAGRAM 1: OPEN KNOWLEDGE PLATFORM FOR SCHOLARLY COMMUNICATION

The restoration and improvement of Southern African universities requires a strategy that focuses on institution-building interventions as presented in Diagram 1 above, while simultaneously building the capacity of individual scientists. Our proposition is that such individual capacity building should be embedded in a framework of building the institutions of science and the platforms for open scholarly communication.

Such interventions and support should be based on the following platform for scholarly communication:

Firstly, a strategic vision for open knowledge in universities which places open access to scholarly communication at the core of creating a visibility-accessibility-productivity relationship. Open access in this context means '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' (Budapest Open Access Initiative, 2002). Such a broad strategic approach will enable greater numbers of scholars to source knowledge from (Southern) Africa, creating the foundations for greater utilisation of this knowledge and hence for greater productivity and visibility.

Achieving this vision will require two major breakthroughs:

- **Breakthrough X** is to systematically create, over the next two decades, a landscape of increasing abundance of research outputs, both peer reviewed and non-peer-reviewed – journals, books, monographs, published reports and thematic papers, documentaries and video materials, theses and dissertations, even in the context of limited financial resources. This will require concentrating efforts in fields of low productivity such as economics, education and environmental sciences, while increasing capacity in fields of

good yield such as public health and tropical medicine. All these forms of research output should be formally recognised by institutional research committees and acknowledged for the purposes of promotion and funding. Universities can encourage the establishment of platforms for research collaboration by academics and post-graduate students across the region, both in the online environment and through face-to-face engagement. The purpose of this push for productivity-visibility-accessibility is to provide a greater engagement with society – making knowledge accessible not just *online*, but *in African society* as well.

- **Breakthrough Y** would involve the systematic introduction of open access publishing and licensing approaches, most notably 'creative commons' licensing (Creative Commons) and other activators for systemic change. The work would include among other measures, extending early efforts to shift to open access journal publishing; developing the capacities for online journal publishing at limited cost while retaining quality standards; introducing institutional mandates for compulsory submission and/or encouraging voluntary deposit of research output for the purposes of online publication (repositories) to promote visibility of authors and their works; and working to effect national policies that support open licensing of public interest research. These efforts can be made in collaboration with organisations such as the SARUA, INASP and eIFL.net, expanding to more Southern African countries, to more HEIs and to more fields of research. The advantage of these approaches is that they would place Southern African research in public view – for researchers, students and other interested parties who may wish to utilise, critique or build on the work. This may also serve to encourage researchers to publish locally, as they would retain the ability to be visible to an international audience.

As in any revitalisation project, capacities that were previously not available have to be brought in and developed. These cultural, change management and capacity building initiatives should include focus on peer review and publishing practices for a range of research publication types and formats; crafting an understanding of the issues in intellectual property rights; lower cost online formats such as print-on-demand; measures to attract high quality publication in local (Southern African) journals. As regards infrastructure, intelligent applications for accessing local research will be as important as the physical network infrastructure.

The breakthroughs presented here are needed to address the constraints to productivity-visibility-accessibility as expressed by the researchers, scientists and managers in the two studies discussed above. Without addressing such concerns, any increase in electronic communications infrastructure may fail to lead to greater visibility of Southern African knowledge. The analysis of the two abovementioned studies further suggests that there is a nexus of productivity-visibility-awareness-accessibility-utilisation.

With respect to the four groupings presented at the beginning of this article, HEIs in Groups A and D, as well as many South African universities where research and scholarly communication are rudimentary, should adopt the breakthroughs at a very basic level, given the scale of the challenge in their environments. Institutions in Group C and South African universities with relatively higher research productivity may consider an approach which makes more rapid progress in relation to Breakthroughs X and Y.

In the final analysis, the revitalisation of Southern Africa's universities and their evolution into African centres of research productivity will only take place if future institutional and

national policy interventions take account of the productivity-visibility-accessibility relationship. An important area for future study will be a review of locally published and unpublished works, in order to gain an understanding of what research is available for publishing on an open access platform. ❑

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COPYRIGHT AND EDUCATION: LESSONS ON AFRICAN COPYRIGHT AND ACCESS TO KNOWLEDGE

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ABSTRACT: The African Copyright and Access to Knowledge (ACA2K) project is a pan-African research network of academics and researchers from law, economics and the information sciences, spanning Egypt, Ghana, Kenya, Morocco, Mozambique, Senegal, South Africa and Uganda. Research conducted by the project was designed to investigate the extent to which copyright is fulfilling its objective of facilitating access to knowledge, and learning materials in particular, in the study countries. The hypotheses tested during the course of research were that: (a) the copyright environments in study countries are not maximising access to learning materials, and (b) the copyright environments in study countries can be changed to increase access to learning materials. The hypotheses were tested through both doctrinal legal analysis and qualitative interview-based analysis of practices and perceptions among relevant stakeholders. This paper is a comparative review of some of the key findings across the eight countries.

An analysis of the legal research findings in the study countries indicates that national copyright laws in all eight ACA2K study countries provide strong protection, in many cases exceeding the terms of minimum protection demanded by international obligations. Copyright limitations and exceptions to facilitate access to learning materials are not utilised as effectively as they could be, particularly relating to the digital environment. Distance learning, the needs of disabled people, the needs of students, teachers, educational institutions, libraries and archives are inadequately addressed. To the extent that copyright laws address the Internet and other information and communication technologies (ICTs), they do so primarily in a manner that further restricts access to learning materials. In summary, national copyright frameworks in the study countries are not geared for maximal access to learning materials, and are in need of urgent attention.

An analysis of qualitative research findings, gathered from the field in stakeholder interviews, suggests that a substantial gap exists between copyright law and copyright practice in each country studied. Many users who are aware of the concept of copyright are unable or unwilling to comply with it or to work within the user rights it offers because of their socioeconomic circumstances. In everyday practice, with respect to learning materials, vast numbers of people act outside legal copyright structures altogether, engaging (knowingly or unknowingly) in infringing practices in order to gain the access they need to learning materials.

In conclusion, evidence from the ACA2K project suggests that the copyright environments in the study countries can and must be improved by reforms that will render the copyright regimes more suitable to local developing country realities. Without such reform, equitable and non-infringing access to learning materials will remain an elusive goal in these countries.

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Introduction

The African Copyright and Access to Knowledge (ACA2K) project, a pan-African research network of nearly 30 academics and researchers from law, economics and the information sciences, was launched in October 2007. In early 2008, researchers finalised a methodology to explore and analyse the intersection of copyright and learning materials in Egypt, Ghana, Kenya, Morocco, Mozambique, Senegal, South Africa and Uganda (ACA2K, 2008). The study countries represent Africa's geographic diversity, as well as its economic, linguistic, religious, cultural and legal differences. This article describes the research project, its results, and ensuing implications for copyright, education and development policies in Africa.

Underlying the ACA2K project is an incontestable fact: that education is essential to human development. Education indicators from the study countries, as below, demonstrate both the urgency of the need and the enormity of the task ahead.

Table 1: Education Rankings of ACA2K Study Countries (range 182 countries)

	UNDP Education Index Ranking (2009) [2]
Egypt	123
South Africa	129
Morocco	130
Kenya	147
Ghana	152
Uganda	157
Senegal	166
Mozambique	172

Source: UNDP, 2009, Education Index: 171-174

The role of copyright in influencing education outcomes – by being a key determinant of access to knowledge, and access to learning materials in particular – has only begun to be studied (Rens et al, 2006; Consumers International, 2006; Chon, 2007) and applies across the educational system from primary to tertiary levels. There are convincing grounds to conceive of access to knowledge (A2K) as a right rather than as a privilege (Yu, 2007; Wong, 2008). It is on this basis that ACA2K researchers have examined national copyright environments.

Copyright law alone does not constitute a national copyright environment. Legislation is only one part of a system that includes regulations, policies, cases and judicial attitudes, and more importantly, copyright–related practices, including perceptions and interpretations of these practices. Researchers engaged in the ACA2K project recognise the need to study systems of law and practice in a holistic way. Of course, taking a holistic view, there are many legal and practical issues affecting access to knowledge, of which copyright is merely one. Yet, copyright is especially important in the context of access to learning materials, the focus of this research.

The overarching question was: To what extent is copyright fulfilling its objective of facilitating access to knowledge in selected African study countries?

2 The education index is a composite of general literacy rates and gross enrolment ratios.

Two hypotheses were established in respect of this research question: (a) copyright environments in ACA2K study countries are not maximising access to learning materials, and (b) copyright environments in ACA2K study countries can be changed to increase access to learning materials. Research undertaken to empirically test these hypotheses was classified under two frameworks: doctrinal and qualitative investigation. Doctrinal research consisted of analysis of each country's copyright laws (including related regulations, policies and case law). Qualitative research consisted of impact assessment interviews with key stakeholders in, and a social analysis of, each country's copyright environment. This paper outlines the results of a comparative analysis of research findings across the eight study countries.

Findings from research on legal doctrines

The legal analysis attempted to understand the nature and scope of copyright protection regarding learning materials, and the extent to which policy-makers in the study countries are cognisant of access-enabling flexibilities and/or have acted upon them.

In this context, the international dimension of copyright protection is of great importance. International copyright treaties and agreements contain, on the one hand, binding minimum standards for copyright protection in member states. On the other, they leave significant leeway to national lawmakers to implement those minimum standards. The most important multilateral copyright treaties and agreements are the Berne Convention for the Protection of Literary and Artistic Works of 1886 (Berne Convention) and the World Trade Organisation (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs Agreement) of 1994. Today most countries, including all ACA2K study countries, are members of the WTO. They must therefore adhere to the TRIPs Agreement. Among other things, TRIPs incorporates important aspects of the Berne Convention (with the notable exception of Article 6bis regarding moral rights) and as a result, members of the WTO have to abide by these elements of the Berne Convention even if they are not party to the Berne Convention itself. Other international treaties and agreements that need to be considered include the World Intellectual Property Organisation (WIPO) Copyright Treaty (WCT) and the WIPO Performances and Phonograms Treaty (WPPT) of 1996, which are together commonly referred to as the 'WIPO Internet Treaties'. In addition, national intellectual property regimes may be affected by bilateral or regional free trade agreements (FTAs).

Colonial influences on national law – and copyright law in particular – can also be significant when examining the scope and nature of copyright protection as well as the utilisation of access-enabling flexibilities. A distinction is generally drawn between the English common law tradition and the continental (Franco-German) civil law system. The former generally adopts a utilitarian view of copyright, while the latter is generally rooted in authors' natural rights. ACA2K study countries reflect both systems, sometimes combined.

A. Copyright scope

All eight study countries afford copyright protection that complies with, and in many cases exceeds, the standards reflected in the relevant international treaties and agreements, including the Berne Convention and TRIPs. This is in spite of the fact that three study countries, Mozambique, Senegal and Uganda, are least-developed countries (LDCs),[3] which technically need not comply with TRIPs until 2013.

3 WTO Classification of Least Developed Countries, Following UN Guidelines, http://www.wto.org/english/thewto_e/whatis_e/tif_e/org7_e.htm

One example of national copyright protection exceeding international requirements concerns the issue of moral rights protection. Though the Berne Convention establishes some standards in this regard, TRIPs does not require countries to protect moral rights. Study countries such as Mozambique, Senegal, Egypt and Uganda nonetheless protect moral rights of attribution (the right to claim authorship), integrity (protection against unauthorised modification) and – in some cases – disclosure (the right to decide if and when to publish the work).

Another finding in relation to the scope of copyright protection is that the copyright laws of six of the eight study countries contain express provisions for the protection of traditional knowledge and folklore, with South Africa being the only country with no such provisions.[4] Many countries outside Africa offer no such protection.

B. Copyright term

International agreements set the standard duration of copyright protection for most literary and artistic works at 50 years from the author's death. After this term, works fall into the public domain. A shorter term of protection expedites the entry of works into the public domain and, therefore, limits the role of copyright term as a potential barrier to access to knowledge. However, in four ACA2K study countries – Morocco, Mozambique, Ghana and Senegal – the copyright term for literary and artistic works has been extended to 70 years from the death of the author (and in the case of Morocco, 70 years from the year following the year of the author's death), a term at least 20 years in excess of the international standard. Only in Morocco was there a legal obligation, via its FTA with the United States, to legislate such an extended term of protection.[5]

C. Copyright limitations and exceptions

Statutory limitations and exceptions are arguably the most important tools for national lawmakers to achieve a balanced copyright system that suits the specific needs of their respective countries. Notably, however, the relevant international copyright treaties and agreements such as the Berne Convention, TRIPs and the WCT all contain a set of requirements against which national limitations and exceptions have to be tested; this set of requirements is commonly referred to as the 'three-step test'. According to the three-step test, limitations and exceptions must be: (1) applicable only in certain special cases; (2) not in conflict with the normal exploitation of the work; and (3) not unreasonably prejudicial to the legitimate interests of the author/rights-holder.[6] The limitations and exceptions found in the copyright laws of ACA2K study countries have never been alleged to violate the three-step test.

The scope of national copyright limitations and exceptions is influenced, among other things, by the philosophical justifications underlying a country's system of copyright protection (Ricketson, 2003). Generally, limitations and exceptions in civil law systems tend to be narrower than those in common law systems.

Against this background, it is convenient to distinguish three main approaches to copyright limitations and exceptions in national copyright laws. First, some countries, especially civil law

4 Legislative drafting is currently in progress.

5 Morocco-United States Free Trade Agreement of 2004, Article 15.5(5), http://www.ustr.gov/trade-agreements/free-trade-agreements/morocco-fta/final-text

6 Berne Convention Article 9(2); TRIPs Article 13

countries, follow a detailed approach and incorporate rather long lists of specifically and narrowly phrased copyright limitations and exceptions into their copyright laws. Second, some countries – most notably the United States – have chosen to introduce into their copyright laws a broad and open-ended provision, the so-called 'fair use' provision that encompasses a large variety of uses. Fair use provisions are usually accompanied by only a few more specific copyright limitations and exceptions. Thirdly, there are countries, especially those in the common law tradition, that have opted for a compromise. While their copyright laws contain specific copyright limitations and exceptions – for example, educational uses or quotations – they also employ so-called 'fair dealing' provisions, which in broader terms generally allow the permission-free use of copyright protected material for certain purposes, in particular for the purposes of research, (private) study, private use, criticism and review, and news reporting. The concepts of fair use and fair dealing must not be confused. Both concepts share the same fundamental idea of permitting uses which are considered fair. However, the concept of fair use is, in general, much broader than the concept of fair dealing because it is not confined to specific purposes. Furthermore, unlike fair use, some of the uses permitted under the concept of fair dealing only pertain to certain categories of protected works. Therefore, fair use and fair dealing are analogous rather than synonymous.

The different approaches followed by countries in relation to copyright limitations and exceptions complicates a comparison: while the private use of copyright-protected material, for instance, may be allowed in one country by a specific private use limitation and exception, it may be covered by fair dealing in another country or fall under a broad fair use provision in a third country.

In this context, a few general observations from ACA2K study countries are worth mentioning. Firstly, only Kenya and South Africa specifically employ fair dealing provisions. While the precise scope of their fair dealing provisions varies slightly, ACA2K researchers in both these countries have concluded that their countries' fair dealing provisions are potentially too vaguely crafted to be a reliable access mechanism. This is particularly so because clarifying case law is rare in both countries. Secondly, at first glance Uganda's Copyright Act appears to follow the US-style fair use approach by employing the term 'fair use'. A closer look at Uganda's fair use provision reveals, however, that this country's fair use provisions should not be confused with fair use as utilised in the United States, Israel, and Singapore. Fair use in these countries entails open-ended categories of permissible uses, subject to a fairness analysis. Uganda's fair use provisions instead contain what looks like a closed list of permissible uses which are additionally subjected to a fairness test. Therefore, Uganda's fair use approach represents some sort of hybrid between the US-style fair use doctrine and the civil law-based approach of incorporating rather long lists of specifically phrased copyright limitations and exceptions. This is a noteworthy observation because, despite the widespread belief about the clear-cut differences between fair use and fair dealing, one must look beyond mere semantics. Moreover, fair use in Ugandan law is actually more restrictive than fair use in the US Copyright Act. Consequently, one should not judge a legal regime simply by the language used; it is necessary to analyse what that language implies.

Limitations and exceptions for the benefit of students, teachers and educational institutions

In the study countries, educational limitations and exceptions generally allow the use of copyright-protected materials in educational settings without the authorisation of the rights-holder or payment of a royalty fee. However, in Kenya and Mozambique entire copyrighted

works may not be utilised for educational purposes. In the other six ACA2K study countries, entire works may be used, subject to varying notions of fairness, under certain conditions. Egyptian copyright law provides for certain automatic exemptions for education, such as the right to hold non-profit performances (which extends beyond the educational context) and the reproduction of short extracts from a work/articles for use in teaching. Egyptian law requires that a compulsory licence be issued in order to use an entire copyrighted work for the purposes of education. In South Africa, Kenya and Uganda, fair dealing/fair use provisions encompass use for both research and study purposes.

Limitations and exceptions for the benefit of libraries and archives

Other than for preservation and replacement purposes, and with the exception of Egypt and Kenya, the copying of entire works by libraries and archives is not explicitly permitted in the study countries. Moreover, in all study countries, limitations and exceptions (in general) lack clarity regarding digitisation of library and archival collections. An additional point to be noted is that the public lending right (PLR) system which exists in some jurisdictions – a system whereby rights-holders are compensated for the availability of their works in libraries, thus making it more expensive for libraries to operate – is not in evidence in any of the study countries.

Private or personal use

Ghana, Egypt, Mozambique, Morocco and Senegal all have copyright limitations and exceptions that are specifically phrased to cater for private use of copyright-protected materials without permission of the rights-holder or payment of a royalty. In South Africa, Kenya and Uganda, personal and private uses fall under fair dealing/fair use provisions. In Morocco, private use is liberally defined: Moroccan law expressly exempts some activities from the scope of the private use exception and limitation, and consequently, other personal uses not specified are permitted. As part of these limitations and exceptions for private use, all study countries permit some degree of private copying of non-digital works.

Quotations

Quoting, without rights-holder authorisation, from copyright-protected work is permitted in all eight study countries. Uganda, Kenya and Mozambique appear to have the most far-reaching provisions for quotations because there are no express, statutory restrictions. In Morocco and Egypt there are some restrictions around quotation. In Egypt, for instance, quotations are only permitted for the purposes of criticism, discussion or information. Ghana and South Africa also impose restrictions on the types of works that can be quoted. In South Africa, the quotation exception does not apply to, among other things, published editions. Both the Ghanaian and the South African statutes expressly require that the quoted work must have been made public before being quoted. Additionally, both South African and Moroccan statutes restrict the length of quotations. They stipulate that quotations must be compatible with fair practice, and that the extent of the quotation must not exceed the extent justified by the purpose.

Limitations and exceptions for the benefit of disabled persons

Only one out of the eight study countries, Uganda, makes specific mention in its copyright law of the needs of the disabled. Ugandan copyright law stipulates that it is not an infringement of copyright when a copyright-protected work is adapted into Braille or sign language for print-disabled people. Thus, no study country, with the exception of Uganda, seems to

consider that disabled persons require enabling copyright provisions to cater to their particular educational needs.

Limitations and exceptions for the benefit of media and the press

Copyright laws in all study countries contain specific provisions for media freedom. The review of copyright-protected works is, for instance, permitted in all eight study countries. So is the use of excerpts of such works in news reportage. With the exception of Senegal, the reproduction of entire political speeches and public lectures/speeches is allowed.

Government works and legal proceedings

Morocco, Egypt, Senegal and South Africa place all official texts of a legislative, administrative or judicial nature in the public domain. With the exception of Egypt, these countries furthermore place the official translations of such texts in the public domain. Legal proceedings are in the public domain in Ghana, South Africa and Mozambique.

In Ghana, South Africa and Mozambique, government and government-funded works are not automatically available in the public domain. Kenya's copyright law puts government works into the public domain but not government-funded works. Ugandan law is contradictory: on the one hand, it excludes 'public benefit works' from eligibility for copyright protection; on the other hand, it assigns trusteeship of such works with the government in a manner that connotes ownership.

D. Compulsory licensing

Compulsory licensing can be a tool to correct market failures or anomalies. When copyright-protected works are not being made available, compulsory licensing may permit an entity other than the rights-holder to exploit the rights. A compulsory licence, typically issued by the state, may be justified if a work is unavailable (including in the desired form, for example, an adequate translation), or unaffordable, or has an owner who cannot be located.

In the copyright laws of Ghana, Kenya, Mozambique, Morocco and Senegal, there is no mention of compulsory licensing. In South Africa, the Copyright Tribunal is permitted to issue compulsory licences in instances where the refusal to license a copyrighted work is unreasonable. Egypt expressly allows for compulsory licensing, limited only (a) for the purposes of education in all forms and at all levels, (b) against payment of fair compensation to the author or his successors, and (c) subject to passing the Berne three-step test.

Countries interested in facilitating the translation of copyright-protected works into languages other than English, French or Spanish can utilise provisions in the Appendix to the Berne Convention (the Berne Appendix). To do so, countries must formally notify WIPO of their intention to avail themselves of the Appendix, and comply with a number of procedural requirements.

Of the ACA2K study countries, only Egypt has provided such notice to WIPO. Egypt, moreover, not only provided notice of its intention to use the Berne Appendix (a notification that has since expired), it also incorporated into domestic law provisions for statutory licensing, to enable the translation of works into Arabic after a certain period of time (three years of the date of first publication). Uganda has not formally exploited the Berne Appendix, but has nevertheless incorporated provisions into national law that mirror the allowances for translation outlined therein. In South Africa, translations pursuant to compulsory licences are permitted only for specific purposes, such as for educational use.

E. Parallel importation

Parallel importation is the practice of importing legitimately-acquired, copyright-protected works from one country into another, without the consent of the copyright-holder in the country of import, typically to address situations where the work is being sold at a lower price in another country. It is neither piracy (the large-scale infringement of intellectual property rights) nor counterfeiting (trademark infringement and fraud). Nevertheless, Egypt is the only study country that expressly permits parallel importation of copyright-protected works. Senegal permits parallel importation only regionally, within the West African Economic and Monetary Union, or Union Économique et Monétaire Ouest-Africaine (UEMOA). South Africa specifically prohibits parallel import of copyright materials.

F. Digital rights management

Digital rights management (DRM) systems are, as the name suggests, systems for managing intellectual property rights in a digital environment. DRM systems can utilise one or more of the following: technological protection measures (TPMs), rights management information (RMI) or end user licensing agreements (EULAs). Provisions related to TPMs and RMI are typically introduced into a national copyright law after a country has signed the WIPO Internet Treaties, which require member states to prohibit circumventing TPMs and/or tampering with RMI.

South Africa, Ghana and Senegal have all signed the WIPO Internet Treaties, but South Africa has not yet officially ratified or implemented these treaties. Having said this, South Africa has enacted anti-circumvention provisions in the Electronic Communications and Transactions (ECT) Act 25 of 2002. Morocco is in the process of ratification of the Internet Treaties, as required pursuant to its FTA with the United States. Also pursuant to that agreement, Morocco was required to implement anti-circumvention provisions in a considerably more precise manner than provided for by the Internet Treaties themselves. It is interesting, therefore, that as these provisions have been implemented in Morocco, libraries, archives, educational institutions and public broadcasters are not subject to prohibitions on circumvention. Morocco, it seems, has availed itself of the small amount of flexibility available from a combination of the Internet Treaties and its FTA with the US.

At this point, among study countries, only Mozambique and Uganda have not enacted anti-circumvention provisions.

G. Judicial decisions

In most study countries, case law with respect to copyright in general, and access to learning materials in particular, is rare. Copyright litigation is uncommon. In Mozambique and Egypt, for example, there is reportedly little or no case law related to learning materials. Research in Morocco, Ghana and Uganda suggests, however, that alternative dispute resolution mechanisms, involving arbitration, negotiation and other out-of-court dealings, are used more regularly. Kenya and South Africa, in contrast, have a relatively rich body of copyright-related case law. However, even in these countries, there is little case law specifically related to learning materials.

In all countries, with the exception of South Africa, there are problems with publication and reporting of judicial decisions, making it difficult to draw firm conclusions about the true state of the case law. The implication is that greater reliance would be placed on statutory provisions in the abstract, without the aid of interpretative guidelines from courts. Depending

on context, constructive ambiguities in the law could either hinder or facilitate access to learning materials.

H. Relevant non-copyright laws and policies

In most study countries, there are laws and instruments other than copyright statutes that affect access to learning materials. These include, most importantly, constitutional protections for fundamental rights to education and/or development. In countries where property rights or intellectual property rights are not constitutionally entrenched, framing education or development as a fundamental right provides important interpretative guidance in determining the scope of copyright protection.

In some countries, there are policies governing aspects of the intersection between copyright and knowledge. For instance, Uganda and South Africa have specific laws dealing with access to government-held information. South Africa also has legislation designed to encourage public institutions and universities to exploit intellectual property rights.[7] Unfortunately, the focus of that legislation is on potential commercial gain rather than access, and consequently, the legislation is lax on safeguarding the public domain – for instance, it does not mandate that the outputs of publicly financed research be accessible to the public. Similarly, the much-lauded free and open source software (FOSS) policy[8] adopted by the South African Government promotes the use of FOSS in government information technology systems, but fails to guarantee public access to content residing on such systems.

I. Conclusions from the research on legal doctrines

National laws in all ACA2K study countries provide strong copyright protection, in many cases exceeding international legal standards and levels of protection offered in some countries outside of Africa. Limitations and exceptions to facilitate access to learning materials are not utilised as effectively as they could be, and exceptions and limitations catering for access to learning materials in the digital environment are mostly absent. Limitations and exceptions for students and teachers, educational institutions, and libraries and archives inadequately address digital technologies, distance learning and the needs of disabled persons. Because there is little or no case law interpreting copyright legislation in respect of learning materials in the study countries, there is considerable ambiguity in the laws of most countries. This ambiguity could hinder or facilitate access to learning materials, depending on the context.

To the extent that copyright laws address the Internet and other ICTs, they do so primarily to restrict access to learning materials by encouraging the use of TPMs and prohibiting TPM circumvention, even for non-infringing purposes. From the doctrinal research, therefore, it can be concluded that national copyright frameworks in the study countries are not maximising access to learning materials, and could be improved to increase access.

Qualitative research findings

J. Scholarly and other literature

An extensive literature review conducted throughout all the study countries demonstrates that there is a generally sparse (but growing) body of scholarship addressing copyright issues (see, for example, Adusei, 2007; Nicholson, 2006; Rens et al, 2006; Ouma, 2004).

7 The Intellectual Property Rights from Publicly Financed Research and Development Act 51 of 2008

8 Policy on Free and Open Source Software Use for South African Government, 2006

Several conclusions can be drawn from a synthesis and analysis of this literature. Practising lawyers in the study countries are generally not active writers on copyright and/or education, unlike their counterparts in developed countries. Furthermore, the scholarship on copyright being produced by African scholars generally reflects African universities' primary orientation toward teaching as opposed to research. More recently, however, there has been some significant research output in the field of copyright being generated by undergraduate and graduate students in law, information sciences, communications and other disciplines, which is encouraging.

There have been relatively few government-commissioned or government-authored reports on copyright and education in the listed study countries. A notable exception to this pattern is, for example, a 2004 study commissioned by the Ugandan Law Reform Commission (ULRC) to examine Uganda's 1964 legislation in light of changing technologies and their potential impacts (ULRC, 2004).

In general, South Africa has more copyright scholarship, particularly in relation to access to knowledge/learning materials, than any other study country. In part, this can be traced to civil society interest and projects around access to learning materials (Rens et al, 2006). The lesson here, for those who would seek to generate greater understanding of, and influence on, copyright laws, practices and policies, is that short-term projects can have significant and lasting impact.

A final observation concerning published resources on copyright and education (and copyright generally) in Africa is that there is a considerable amount of information available in the form of cursory media coverage, opinion commentaries and rights-holder-generated publicity. ACA2K research suggests that such publications typically lack depth of analysis and present only a partial picture by focusing on copyright protections rather than access-oriented flexibilities in copyright law. There is a distinct need therefore for innovative, mass-based communication that presents a balanced perspective on copyright issues.

K. Impact assessment interviews

In order to assess the true impact of copyright laws on day-to-day practices, a series of impact assessment interviews were conducted to gather qualitative empirical data. In each study country, researchers engaged a variety of key actors and stakeholders, including representatives from government, the education sector, and rights-holder groups. Feedback reported through the interview process addressed several thematic areas and revealed the following insights into copyright and education.

General access issues

Some, but not all, groups of interviewees perceive copyright as one of several barriers to accessing learning materials. Most people who said they did not perceive copyright as a barrier were unfamiliar with copyright law, and when informed about applicable rules in their country, acknowledged that their modes of access are often illegal. In general it was found that in cases where copyright does not act as a barrier to access to learning materials, it seems largely to be due to ignorance of, or disregard for, the law.

Government strategies to enhance access to learning materials, by, for example, commissioning materials or subsidising textbook purchases, are mainly directed at primary and secondary education sectors. This is the case in Kenya, Uganda, Egypt, Ghana and Mozambique. In most study countries, learning materials at tertiary level are sourced

internationally and/or locally photocopied, and rarely subsidised by governments. The lack of affordability of tertiary-level learning materials was cited across all study countries as the primary reason for large-scale (often illegal) photocopying by students and the commercial photocopying operations serving them. In markets such as Uganda, the lack of distribution networks for learning materials also contributes to inaccessibility.

Administration and enforcement

In all study countries there are government agencies tasked with some aspects of copyright administration or enforcement. Some copyright agencies' primary duties include licensing collective societies and setting royalty tariff rates for particular activities. Other countries' agencies are tasked with public engagement and raising awareness of copyright issues. Yet others are in charge of organised copyright enforcement programmes. Across this spectrum of copyright administration and enforcement agencies, there are a wide variety of views about the relationship between copyright and education. Generally, evidence suggests that public and expert views on this topic correlate to the relative sophistication and experience of agencies administering and enforcing copyright in a particular country. Based on data obtained through impact assessment interviews, these agencies can be classified as weak, emerging or strong.

Study countries with relatively weak administrative institutions are Uganda, Senegal and Mozambique. These countries' administrative or enforcement agencies have only recently been established by statutes, or operate without sufficient financial, human and other resources. Countries such as Kenya, Ghana and Egypt have emerging institutions that are building strength and capacity. Institutions that administer copyright in these countries have either existed for a considerable period of time or, if they are newly established, have received substantial government support. In South Africa and Morocco, administrative institutions can be characterised as relatively strong. Agencies in these countries have existed longer than agencies in most other study countries. Strong economies in both these countries enable the relevant administrative institutions to be sufficiently resourced.

Classifying a country's administrative institutions as 'weak' or 'emerging' or 'strong' is a useful frame for understanding the kinds of programmes operated, and the copyright perspectives promoted. Evidence suggests that the weaker the institutional framework, the more dependent the administrative agency is on external financial, technical and other kinds of support. This dependency renders weak institutions more susceptible to undue influence from particular constituencies of stakeholders. Because of information asymmetry and skewed economic incentives for participation, the supporting stakeholders have tended to represent large groups of industrial rights-holders, such as record companies or book publishers, rather than representatives of education sectors. For example, the push for greater protection and enforcement in Senegal and Uganda is led by musicians supported by the music industry.

Similar problems are evidenced in countries with emerging institutions, like Egypt, and with strong institutional frameworks, such as Morocco. However, with a strong institutional framework, processes tend to be more participatory, and programming more reflective of a diversity of interests impacted by copyright policy and practice. For instance, copyright administrators in South Africa have demonstrated greater willingness to engage concerns around access to knowledge than their counterparts in other ACA2K study countries.

There is also evidence that stronger institutions correlate with (though may not cause) increased awareness and enforcement of copyright. Throughout all the study countries,

systemic copyright infringement is widespread. But infringement appears to be least rampant in the country with the strongest institutional framework, South Africa. Elsewhere, in every other study country, there is evidence of complete ignorance of or disregard for copyright law, in the context of photocopying entire books, for example. The reasons for such infringements are complex, but essentially reflect most people's fundamental inability – not unwillingness – to comply with legal rules that bear little relation to their behaviour, circumstances or needs. It can be argued that countries with stronger copyright institutional frameworks (not stronger copyright laws) will be better able to grapple with the daily realities facing their citizens, and to calibrate copyright policies and practices accordingly. It may also be that countries with strong copyright institutions are likely to be those with stronger publishing and distribution infrastructure for learning materials.

Educational institutions/libraries

Photocopying of learning materials at and near tertiary educational institutions is commonplace in most study countries. Some copying activities – such as selling photocopies of entire copyright-protected books that are still in print, for example – are clearly illegal. Other activities, such as students or teachers copying parts of books, however, are less clearly an infringement of copyright.

There are significant differences in the resources available to tertiary students and educational institutions in ACA2K study countries. Educational institutions in Senegal (which is among the least economically developed of the study countries) face some of the most significant access challenges. For example, the law library at the Université Cheikh Anta Diop in Dakar has book stacks full of photocopies rather than printed textbooks, because students vandalise the originals. Signs posted next to photocopiers contradictorily instruct students to photocopy pages rather than tear them, while noting that photocopying could be an infringing activity. Libraries in most other study countries are somewhat better resourced, although it is still common that pages are ripped out of library books and that infringing photocopies are made. Libraries in several of the study countries have taken some steps to develop institutional policies on copyright and/or access. Whether those policies are rational or realistic is, of course, another matter altogether.

Some well-resourced and well-intentioned institutions are failing to fully capitalise on access-enabling opportunities. The Bibliotheca Alexandrina (BA) in Egypt is an example. As a UNESCO world heritage site with significant funding, the Bibliotheca has acquired state-of-the-art technology to print books on demand. Its institutional policy concerning use of this potentially revolutionary technology is, however, problematic. Essentially, the service has only been demonstrated for distinguished visitors, such as heads of state. Copyright negotiations with publishers are holding back the technology's potential, while a quirk of Egyptian copyright law requires government permission to copy public domain works for commercial use, which means that even works for which copyright has expired are not being printed/distributed as they could be. The situation is all the more ironic given that certain staff members at the Bibliotheca are renowned for being among the continent's leading experts advocating greater access to knowledge.

There is a startling disparity, in resources and expertise available to address copyright issues, between the Bibliotheca Alexandrina and other educational institutions in Egypt, such as the University of Alexandria's law library. Such disparities are seen in other study countries, including South Africa, where institutions such as the University of Cape Town have excellent

library infrastructure and resources while others like the University of Limpopo struggle to keep their libraries updated.

Gender-specific issues

Undeniably, gender has an impact on knowledge, to the extent that gender imbalances exist in society at large. While the ACA2K research explicitly investigated the hypothesis that gender has a distinct impact on the relationship between copyright and access to knowledge, the evidence produced was inconclusive, suggesting that further, purpose-specific work needs to be conducted in this area.

ICT Issues

All study countries reported that the ICT infrastructure remained weak in most institutions. Senegal's Université Cheikh Anta Diop has a very small number of computers from which to access an Intranet (not Internet), and still relies primarily on card catalogues. The University of Cape Town in South Africa was reported to have robust institutional ICT infrastructure, combined with digital resources that fully support the research needs of the academic community. Institutions like Makerere University in Uganda, Universidade Eduardo Mondlane (UEM) in Mozambique, and the University of Ghana Legon, have reasonable ICT infrastructure and are able to provide their communities with access to a wide range of electronic resources. In Ghana, sharing of electronic resources among some universities is occurring through the Consortium of Academic and Research Libraries (CARLIGH). In Mozambique, UEM's new online distance learning programme is an ambitious and fairly well-resourced ICT-based access programme, illustrating that innovative institutional use of new media is entirely possible even within a least developed country. There are, however, still deep uncertainties and misunderstandings about the copyright rules and practices that apply to such distance education initiatives.

L. Conclusions from the qualitative analysis

A significant gap exists in each of the study countries between copyright law and copyright practice. Many consumers who are aware of the concept of copyright are unable to comply with it or to exploit the protections it offers because of their socioeconomic circumstances and/or the circumstances at tertiary institutions from which they operate. Others users are ignorant of the concept of copyright, but tend to pursue learning materials access in the same manner, and driven by the same socioeconomic constraints, as those who know about copyright. In everyday practice, with respect to learning materials, vast numbers of people act outside of legal copyright structures altogether.

Copyright and education in Africa: the road ahead

Empirical evidence gathered during more than two years of work by nearly thirty researchers investigating copyright laws, policies and practices in eight African countries has provided a valuable opportunity to assess how copyright environments really impact access to learning materials.

Perhaps the most important revelation from this research is that copyright laws in all study countries comply with international copyright standards. In many cases, the African countries studied provide even greater protection than international legal norms require. Thus, the countries studied do not need advice or assistance in drafting legislation to bring levels of legal

protection up to par. Simply put, Africa does not need stronger copyright laws. Realising this point is urgent, as some of the study countries – Kenya, Ghana, South Africa – are in the midst of revising, or planning revisions, to their copyright laws.

Throughout the continent, however, there is a lack of awareness, enforcement and exploitation of copyright. A substantial gap exists between copyright law and copyright practice in all countries studied. Empirical evidence has confirmed the intuition and impression that copyright law in Africa is widely ignored. The disconnection between law and practice manifests in various ways. Many people do not know that copyright law exists. Those who are aware of the concept of copyright are unable to comply with it or exploit the protection it offers because they cannot afford to. Vast numbers of people act outside of the formal copyright system altogether.

Access to learning materials is obtained primarily through activities that infringe copyright. When – and if – the enforcement of sanctions against copyright violation becomes a greater reality in the study countries, then, without mechanisms in place to promote and ensure non-infringing access to knowledge, many learners, particularly at the tertiary level, will be in a precarious position and entire systems of education will be vulnerable. Thus, maintaining the status quo is not a sustainable policy option. Openly expecting learners to infringe copyright in order to obtain access to educational materials has a detrimental effect on the integrity of the copyright system. Copyright laws that cannot possibly be followed by the vast majority of society only serve to generate resentment for their underlying principles, and ultimately undermine respect for the law.

The consequences of maintaining unrealistic copyright systems are serious. Though there are many additional barriers to access to learning materials, the ACA2K research project has revealed that copyright is an important and under-researched barrier. The research suggests that an appropriate and sustainable copyright environment is a key component of a well-functioning education system. Though all countries studied have other urgent public policy matters to address, from health crises to security and political stability concerns, the importance of education in addressing these and related development challenges should not be understated.

For these reasons, the recommendation is that all stakeholders throughout and beyond Africa work toward solutions that help to bridge the gulf between copyright law and practice. There are essentially two ways to narrow this divide: modify behaviours and/or reform laws.

Expanding copyright protection even further beyond international norms is almost certain to aggravate compliance challenges. It is already impossible for most people in Africa to adhere to existing legal requirements; compliance with even stronger laws is clearly unattainable. In addition, the lack of enforcement of existing copyright rules is primarily attributable to widespread inability, not unwillingness, to comply with the law. Copyright infringement to obtain learning materials in Africa is thus the consequence of a lack of appropriate exceptions such as those found in the laws of many developed and developing countries.

Evidence from the study countries strongly suggests that the copyright environment can be improved by legal reforms that make copyright more flexible and suitable to local realities. Paradoxically, less restrictive laws could provide more effective protection, because they would enable entire segments of the population currently operating outside the copyright system altogether to comply with limited, realistic rules. This could, in turn, increase awareness of and

respect for the concept of copyright, compounding in the longer term to bolster the effectiveness of the system for all stakeholders.

Reports from ACA2K study countries contain several specific examples of best practices, as well as areas for improvement, for lawmakers, rights-holders, and the education sector. Blanket collective licensing works well at institutions such as the University of Cape Town, where students typically comply with the terms of these licences with regard to hard-copy course materials. At the University of Ghana, Legon, however, the blanket licensing systems being established have little connection to the everyday realities of life on campus, where widespread photocopying of entire textbooks regularly occurs. In such a context, standard-form contracts modelled on South African (or, worse, European) precedents are inappropriate. At the Université Cheik Anta Diop in Dakar, Senegal, where practices align more with the Ghanaian than South African experience, a similarly geared context-specific solution is warranted.

Locally-produced objective policy research has also proved to have a positive impact on access to learning materials. Countries with more local copyright expertise have a demonstrably richer policy debate, which, in some cases, has led to desirable law or policy reform initiatives. South Africa, for instance, is home to the continent's largest collection of copyright scholars who are advocating for access to knowledge, and this has created a policy environment that is favourable to all stakeholders in the debate. In sum, governments throughout Africa, and their national and international supporters, would do well to increase investment in local policy research, and grow the community of intellectual property researchers based in Africa. ❑

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FOUR

'DAZZLING TECHNOLOGIES': ADDRESSING THE DIGITAL DIVIDE IN THE SOUTHERN AFRICAN UNIVERSITIES

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ABSTRACT: The 'digital divide' is both an infrastructural reality and a metaphor for Africa's position in the global economy. We live in an era that defines itself by the extent to which it interacts, creates and shares knowledge globally, using the network of advanced telecommunications, the Internet.

Southern African countries, their universities and research communities, are recognising that focusing purely on basic network infrastructure is inadequate to the needs of scholarly research and higher education in the 21st century. Southern African universities must acquire the means to participate effectively in global knowledge production. In particular, they must adopt and use advanced telecommunications infrastructure in the form of National Research and Education Networks or NRENs and a regional REN to connect students and researchers across national borders.

Yet the means to share knowledge is not sufficient to bring about a healthy knowledge economy. A paradigm shift has to be made from a purely technological view of the issues, to a full recognition of the interplay between technological infrastructure and the developmental and knowledge purposes to which it is put.

This article provides an overview of the emerging NREN landscape, noting developments under way that are intended to promote and facilitate excellence in scientific networking in the region. It discusses the constraints and enabling conditions for overcoming the digital divide in the Southern African higher education context. Finally, it proposes a rudimentary performance indicator framework for assessing progress.

Bandwidth, connectivity and research collaboration

The countries of Southern Africa are poorly served with respect to ICT resources and access to the Internet, resources that are sorely needed by higher education institutions in the sub-region in order to enable Southern Africa's knowledge to permeate the classrooms and other spaces where ideas for a future world are being wrought. Southern African scholars publish in a range of knowledge fields, with important contributions in the health sciences (with some specialisation in public health, tropical medicine, and infectious diseases), in the agricultural sciences, geology and earth sciences, as well as some work in the marine and space sciences (Mouton, 2007). These emerging bodies of knowledge are poorly utilised by students, scholars and researchers as they cannot easily be accessed, either in print or in electronic format. Nor do Southern African researchers participate effectively in global or regional research communities, which have come to rely on high-speed electronic networks for conducting and producing research.

Ng'ambi (2006) argues that ICT must become a centrepiece of university infrastructure – bringing free and open software and collaborative web-based teaching tools into the learning endeavour. It is argued that:

> *Bandwidth is the lifeblood of the world's knowledge economy, but it is scarcest where it is most needed – in the developing nations of Africa which require low cost communication to accelerate their socio-economic development. Few schools, libraries, universities and research centres on the continent have any internet access. For those that can afford it, their costs are usually thousands of times higher than for their counterparts in the developed*

world, and even Africa's most well-endowed centres of excellence have less broadband than a home broadband user in North America or Europe (Jensen, 2006: 2).

The November 2005 conference of the Association of African Universities (AAU) preparatory to the Tunis World Summit on the Information Society (WSIS) articulated the following objective, as presented by Pehrson & Ngwira (SARUA, 2006: 3):

No later than 2008, universities and research institutions in Southern Africa will have access to broadband services and the global Internet on the same level as peers in the developed parts of the world, with a quality of service in the Gbps rather than Kbps range, and delays, variations and error rates as defined by normal properties of properly run terrestrial fibre networks.

The objective was laudable, but was never met. The supporting role that ICTs in general and national research networks (NRENs) in particular might play in fostering the wide-scale availability of textual, audio and video resources has not yet materialised, nor has the flow of research data to the higher education community. This article considers how it might be possible to execute such a remarkable jump across the digital divide. In particular, it provides an overview of some of the main initiatives in the South African Development Community (SADC) region; and of the array of constraints and enabling conditions that exist in terms of harnessing knowledge technologies for the purposes of higher education, research development and scientific networking. It presents an evaluative framework of key performance indicators for research networks at the campus, national, regional and international levels, viewed from the perspective of universities. This framework may be used to review the success of existing and new initiatives.

The digital deficit and the future of Southern African universities

First, it is useful to situate the discussion using indicators on the nature and extent of Africa's digital deficit, and on where the impetus for an upsurge in digital capacity in Southern African universities is intended to come from. The future of Southern Africa is intertwined with the infrastructure realities of the broader continent, hence reference is made to the African context.

Africa's estimated population of some 991 million represents approximately 14% of the world total, with 67.3 million Africans or 3.9% of world population using the Internet (Internet World Stats, September 2009). Of the top ten Internet countries in Africa, two (South Africa and Zimbabwe) are in Southern Africa and these two are the only ones in the SADC region to have Internet user populations of more than a million people (ibid). Broadband penetration for the whole of Africa is lower still at around 0.1 fixed broadband subscribers per 100 inhabitants and 0.9 mobile broadband subscribers per 100 inhabitants (ITU, 2009: 2). Given that the number of Internet users in a country is an indicator of ICT adoption, that world Internet penetration is estimated at 25.6% and that broadband penetration in many developed countries is surging ahead, the digital divide as portrayed here between the African and world averages is stark indeed (Internet World Stats, 2009; Rena, 2008).

Data on increases in African Internet usage indicate very fast percentage rates of growth. While the population of global Internet users grew by 380% in the period 2000-2009, and South Asia's population of Internet users grew by 900% (Khan, Cottrell, Kalim & Ali, 2008: 10),

Africa's usage grew by 1 392% (Internet World Stats, 2009). This translates into growth of between 91% (South Africa) and 57 900% (Democratic Republic of Congo, DRC) for Southern Africa. Despite these exceptionally high rates of growth, the level of Internet penetration in 2009 was less than 10% of population in all SADC countries except the islands of Seychelles and Mauritius (ibid). In eight SADC countries, Internet penetration is below 5% and levels of 0.5 – 1.5% pertain in the DRC, Madagascar, Malawi and Tanzania. These levels (5%) are similar to those of the eight countries[1] in the South Asian region, which are nevertheless engaged in building NRENs (Khan et al, 2008). The extremely low levels of Internet penetration in the latter group of Southern African countries can be explained by virtue of the existence of very large populations in the context of very low gross national incomes per capita (AfDB, 2009), as well as the existence of weak policy and regulatory institutions for the ICT sector.

The uptake of mobile telephony in Africa (attractive for its relative accessibility and affordability) is very high; however the potential of this platform for increasing Internet penetration on the continent is limited by high costs of mobile broadband (Gillwald, 2008: 14). Several studies, including a study under the auspices of the Southern African Regional Universities Association (SARUA) have found Africa to be covered with thousands of kilometres of high-capacity optical fibre cabling, as deployed by fixed and mobile telecommunications operators and power utilities extending and upgrading the power grid (Martin, 2006b: 2-3; SARUA, 2006: 5; World Bank, 2008: 10). However, universities in the Southern African region are largely disconnected from this communications infrastructure, because of either policy or financial constraints, or both. These limitations with respect to both fixed and mobile Internet access creates a scarcity of channels available to students, academics and researchers for increasing their access to local and global knowledge.

Importantly, there appears to be a swing in top-level African political commitment towards addressing the digital divide: there is recognition that increasing access to localised broadband connectivity is essential to Africa's socio-economic development and that optical fibre networks are the best means to supply reliable high-speed international bandwidth at reasonable cost (eAfrica Commission, no date). The New Economic Partnership for Africa's Development (NEPAD) has established the NEPAD ICT Broadband Infrastructure Network Project which aims to connect all African countries to one another and, in turn, to the rest of the world through broadband fibre-optic submarine and terrestrial systems. It envisages an African broadband network that will provide abundant bandwidth, easier connectivity and reduced costs, while integrating the continent through the facilitation of trade, social and cultural exchange (ibid).

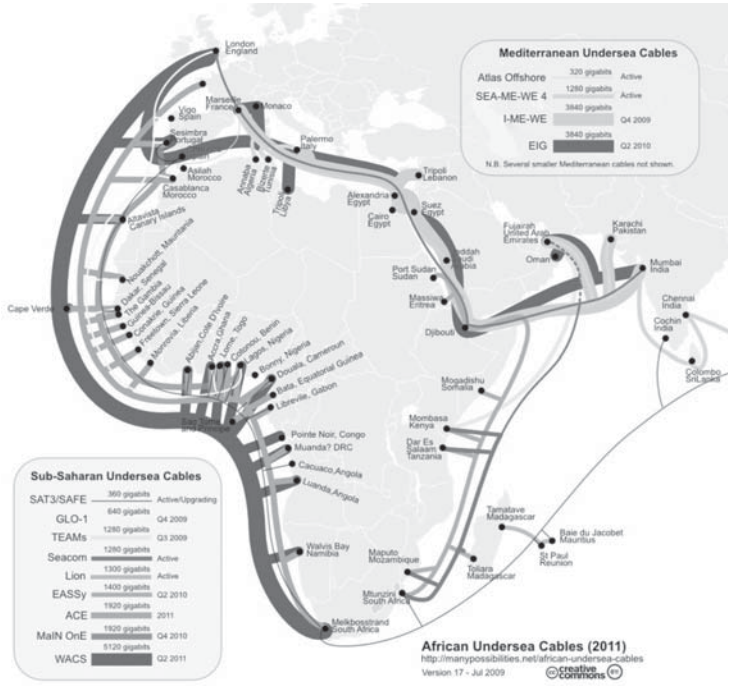
The project framework established by NEPAD for the initiative takes as its point of departure that the infrastructure should be viewed as a public good, operated on a cost-recovery basis, with non-discriminatory open access (access for all 'authorised service providers' on the same terms and conditions) and equitable joint ownership of the backbone infrastructure across the continent (eAfrica Commission, no date). In 2006, 12 Eastern and Southern African countries[2] signed the Kigali Protocol encapsulating the policy principles and details of the Special

1 Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

2 Botswana, Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Rwanda, South Africa, Tanzania, Uganda, Zambia and Zimbabwe.

Purpose Vehicles (SPVs) that will own, operate and maintain the network[3] in these sub-regions. In addition, a broadband network for West, Central and North Africa has been agreed by NEPAD with exploratory studies and planning currently under way (ibid). The advocacy work of groups such as eGY-Africa[4] with regard to research networking has made a significant contribution to achieving this commitment (Barton et al, 2009).

There has been no shortage of private-sector activity – including partnership with the public sector – to begin providing much-needed broadband infrastructure and capacity to the region, though the current focus of activity is on the undersea cable environment represented in Map 1 below. There are three main complementary projects (EASSy, Seacom, and TEAMs[5]) that have been racing to deploy fibre along the Eastern coast of Africa. The current front-runner is Seacom, whose service went live in 2009, offering high-capacity bandwidth at significantly lower pricing levels than the satellite connectivity on which African countries have historically relied. Good progress has also been made by TEAMS, a project funded by the Kenyan government and Etisalaat (UAE) to link East Africa through the United Arab Emirates to other global connectivity systems. EASSy involves 26 telco operators and is 90% African owned, with ownership underwritten by substantial investment from development financing institutions including the European Investment Bank and the African Development Bank (AfDB).



Source: Song, S http://manypossibilities.net/african-undersea-cables/

Map 1: Prospective African undersea cable system

3 UHURUNET is the submarine segment of the network in Eastern/Southern Africa; UMOJANET is the terrestrial component.

4 See http://www.egy.org/egyafrica.php

5 EASSy, Eastern African Submarine Cable System; KDN, Kenya Data Network; TEAMS, The East African Marine System; SEACOM, Southern and East Africa Communications.

In short, Southern Africa's current hopes of accessing and deploying the 'dazzling technologies' invigorating higher education and research in the developed world rest on the following:

- the successful completion of the various undersea cable projects;
- the deployment of NRENs in every country in the SADC region;
- active measures by universities in each country to accelerate the uptake and usage of the capacity of existing NRENs and of new NRENs in formation, in order to foster research collaboration in the SADC region;
- translation of the stated determination of political leaders to connect African education and science to the world into explicit policy to advance the formation of NRENs and their connection to a regional REN;
- the design of new regulatory frameworks in each country to provide the enabling environment for NRENs to operate effectively and at reasonable cost, while eliminating barriers to their advancement; and
- the ability of markets to take advantage of the foregoing to connect Africa to the world through the undersea cable systems.

Are these factors sufficient and appropriate to fulfil expectations of high-speed connectivity for higher education research and teaching? What challenges, obstacles and possible cross-purposes must be cleared? What opportunities, potential and conditions must be created to facilitate rapid evolution of network capacity and greater utilisation?

Enabling conditions and constraints for national research and education networks (NRENs) in Southern Africa

In Southern Africa, as elsewhere, the rise of the Internet can be largely attributed to the academic and research community. Universities introduced or pioneered access to the Internet in South Africa (UNINET made its first TCP/IP connection in 1991); in Zambia (in 1994 the University of Zambia established the country's first ISP, ZAMNET); and in Mozambique (Eduardo Mondlane University went online in 1995). The first physical multi-country academic and research network in Africa was the East and Southern Africa Network (ESANET), established in 1991 to connect universities in Uganda (Makerere University), Kenya (University of Nairobi), Zambia (University of Zambia) and Zimbabwe (University of Zimbabwe) (Twinomugisha, 2006: 6-7). The current limitations in Internet usage for educational and research purposes can be addressed through a number of measures, in particular through the introduction of dedicated national research and education networks (NRENs) and regional RENs (RRENs).

NRENs are publicly-funded, interconnecting fibre backbone networks that are designed to operate for a distinct sector, the higher education and research sector, often in the context of the development of national innovation systems. Data transfer across these electronic networks at high speeds enables knowledge sharing and online communication among research teams, and with post-graduate research students, linking academic communities irrespective of their geographic location. It is argued that NRENs play both a supporting role for research delivery by enabling data transfer and communication, and a direct facilitation role in that they enable research teams to construct virtual platforms for experimental design and research collaboration. Regional RENs are typically the work of special

agencies, such as DANTE[6], established by eleven European NRENs to design, create and operate advanced networks for research and academic collaboration across Europe. DANTE also undertakes projects to promote research networking in Europe, as well as to create Internet infrastructure in other regions of the world for the purpose of linking researchers in these countries with researchers in Europe (DANTE, no date).

Given a context of improved future global and local connectivity through a much advanced African undersea cable environment as discussed above, the evolution to 'established NRENs'[7] in Southern Africa could lead to greater research collaboration. This would compare favourably with the existing low levels of collaborative output from Southern African and African researchers (a small productive pool of researchers from Botswana, Cameroon, Kenya, Malawi, South Africa, Tanzania, Zambia and Zimbabwe). It is noted that the levels of collaboration of African scholars with researchers in regions other than the African region is significantly greater (UK, USA, Australia, Canada and Europe) (Mouton, 2007: 270-272)[8], and this research networking can also advance on the basis of the operation of a larger number of established African NRENs as well as RRENs.

The emergence of African NRENs is aimed at gaining access to high capacity bandwidth to enhance research capacity and output, but these networks have evolved under circumstances of continued dependence on satellite and dial-up connectivity (Martin, 2006b: 6-8). The objective in view by Southern African universities is for high-capacity (at least 100Gbps) backbone networks across countries and the region; open access to these networks using any available fibre; network convergence towards an African regional REN; and access to the European REN Géant as well as to other international networks (Martin, 2006a: 20; Martin 2008: 7). This strategic objective is based on the recognition that the existence of broadband infrastructure for general Internet use is not sufficient to address the particular needs of research entities and that infrastructure must be dedicated to the needs and purposes of higher education, particularly research.

An overview of the work of Ubuntunet Alliance[9] and a review of the FEAST roadmap (European Commission, 2009b) illustrates that NRENs in Southern and Eastern Africa (Democratic Republic of Congo, Kenya, Malawi, Mozambique, Rwanda, South Africa, Tanzania, Uganda and Zambia) are focused both on promoting national research missions and on formation of an African REN, while new RENs are being established in Botswana, Lesotho, Mauritius, Namibia, Swaziland and Zimbabwe. The functionalities of these NRENs are uneven and still maturing, according to Barry (2008) as presented in Map 2 below. The most advanced countries in this regard are Kenya and South Africa, with KENET (Kenya Education Network) and TENET (Tertiary Education Network) focused on ensuring the availability and affordability of high-speed networks to support using the Internet in academic teaching and research. An important function of emerging African NRENs/RRENs will be to act as bandwidth purchasing consortia (Martin, 2006a: 9; Martin, 2006b: 8-9). This purpose has been a central part of the work of TENET.

KENET (Kenya) and the new SANREN (South Africa) will extend current research networks to include research institutions, with SANREN planning to connect 50 higher education and

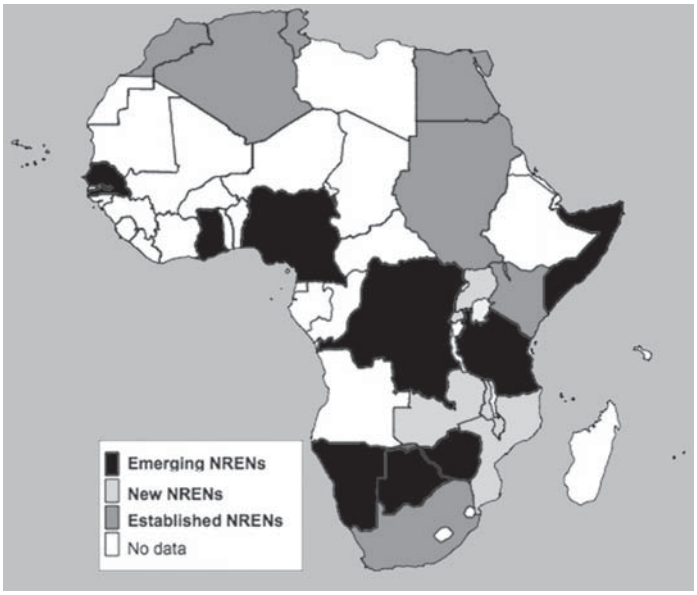
6 Delivery of Advanced Network Technology to Europe

7 Barry, B (2008) uses a typology of established, new and emerging NRENs.

8 This is a limited view of research collaboration based on publication in ISI-listed journals.

9 http://www.ubuntunet.net

research institutions to its 10Gbps network by 2010, and thus also to higher education and research institutions abroad (DST, 2009). While one of SANREN's major objectives is to position South Africa effectively for the competitive bid for the Square Kilometer Array radio-telescope project, the effective increase in research output as an outcome of the utilisation of SANREN's capacity is a thing of the future.



Source: Barry, B (2008)

Map 2: Status of NRENs on the African continent

According to Barry (2008), RENs are important for Africa because they are one of the only possible means for African scientists to connect to each other and for global research teams to move from an era of research isolation to an era of research collaboration. However, this can only occur when publicly available bandwidth becomes affordable for universities. Making broadband infrastructure and services available and affordable is the mission of the Pan-African regional REN, the UbuntuNet Alliance for Research and Education Networking (UA), formed in 2005 with the active support of Southern African and African higher education associations and of international development and donor organisations. The purpose of UbuntuNet Alliance is to support the development of NRENs in Africa and to organise and operate regional RENs for sub-Saharan Africa. These RRENs would then connect to GÉANT[10] and GÉANT2 (Europe) and other RENs worldwide, for example, Internet2 (global north) and RedCLARA (global south). In theory, these linkages should encourage sub-regional and international research collaboration, with African countries benefiting from indigenous research and knowledge production. However, infrastructure alone may not be sufficient to produce a shift towards indigenous research agendas and outputs.

In 2008, following a consultative process with stakeholders and technical specialists, the European Commission (EC) commissioned a feasibility study (FEAST) that would inform the

10 According to the project website, www.geant.net/pages/home.aspx the GÉANT RREN and the European NRENs currently connect 40 million users across 40 countries and 8 000 institutions.

measures being taken to connect African higher education and research institutions with each other and with Europe. A major objective of FEAST is to provide a roadmap to implement the EC-sponsored AfricaConnect initiative. The initiative will support the establishment of sustainable and extendable regional backbone networks dedicated to the interconnection of African NRENs to each other and to the world via the pan-European GÉANTNetwork. The EC has already successfully undertaken similar initiatives for Latin America (RedCLARA), North Africa and the eastern Mediterranean (EUMEDCONNECT2), Asia-Pacific (TEIN3) and central Asia (CAREN).

A pre-condition for a country's participation in the AfricaConnect programme is an effectively functioning NREN. The FEAST Roadmap (EC, 2009b) contains assessment criteria for this, which include adequate staffing and capacity, published acceptable use and connection policies, interconnected campus networks and identification of research projects that will utilise the RREN services. In Southern Africa, Kenya and South Africa meet the set criteria, with Mozambique and Rwanda requiring a few simple actions in order to meet the criteria for participation (DANTE, 2009: 23–24).

The FEAST study (EC, 2009a) and the associated Pehrson et al (2009) paper make the following observations with respect to the prospects for connecting African researchers to their global peers:

(a) There are mutual benefits for both the African and non-African research and academic communities in setting up relationships for future collaborations in knowledge production.
(b) There has been significant development of backbone infrastructure in the region, bringing real opportunities for the connection of African researchers to their global peers.
(c) Ten African NRENs and academic communities (less than a fifth of African countries) are at a level of readiness to connect operational terrestrial networks in the initial phase of AfricaConnect.
(d) High-bandwidth undersea cables being deployed or constructed along the east coast of Africa bring the potential of high-bandwidth/low-cost closer to the African market. Terrestrial optical back-haul infrastructure to serve land-locked countries is already being designed and commissioned.
(e) Institutional and national transitions to exploit these transformative infrastructures will require extensive cooperation between government and institutions, capacity-building for academics and technical staff, and investment in campus ICT facilities and local access networks.

The change in research output as a result of NREN operations in Southern African countries, and as a result of the operation of a regional REN for the continent, will be an important subject for future study. For now, a framework for understanding the performance of NRENs and regional RENs from the perspective of universities and the regional higher education system requires some attention. This framework can be crafted by reviewing a number of constraints to research networking.

Constraint 1 Multiple infrastructure layers for NREN effectiveness

A major constraint to be dealt with on the way to high-speed connectivity has long been evident: lack of campus-level infrastructure and facilities for bandwidth management. While attention is given to the accelerated provision of undersea cabling and national backbone fibre networks, the importance of establishing basic infrastructure inside universities cannot be forgotten, and

remains an unmet need in many institutions in the region. ICT infrastructure can be conceived as a 'layer cake' or a pyramidal set of building blocks (Adam, 2007) comprising: campus-level networks and ICT resources; the content and applications available through these resources; the way in which the campus-level infrastructure combines with national infrastructure to create an NREN; and finally, regional and global links through wider-reaching RENs. Each of these layers enables particular uses. Campus level infrastructure enables student and researcher access to electronic academic resources that can be cost-effective for resource-constrained institutions, for example, multiple-access electronic journals versus a single hard copy in the library. NRENs offer opportunities for in-country collaborative research practices and linkages to regional and international RENs.

However, at the simplest level, the challenges associated with campus-level networks in Southern African institutions include the uneven mix of technologies as a result of donations from partner institutions in developed countries; demands for continuous upgrading of systems to keep pace with technological developments and user needs; and the multiple purposes to which scarce ICT resources must be applied, including administration, teaching and learning, research, and special scientific applications. At the more complex layer of regular interactive research collaboration and knowledge exchange, the effective operation of NRENs requires all campuses in a higher education system to have well-managed fibre backbone and to achieve sufficiently fast connectivity speeds for online collaboration and data transfer. This is seldom the case, as few countries in the region have established organisations that can manage the bandwidth environment for the system as a whole.

Progressing effectively through these layers to connect researchers across Southern Africa with each other and the world is of the utmost strategic importance, as it is here that knowledge is created and assimilated, not merely accessed, creating the opportunities for customised solutions to regional developmental challenges.

Constraint 2 Vision of education and research networking

A second constraint for advanced higher education and research networking is limited vision and/or understanding within and across the various involved sectors, perhaps indicating a 'development policy divide' as much as a digital divide (Nishimoto & Lal, 2005). The paradigm shift required for envisioning Southern African universities in the digital age has to occur across a spectrum from a purely technological take on the issues to a full recognition of the developmental purposes to which the knowledge flowing across these networks can be put. Political and system-wide advocacy would need to focus on such themes as the significance of ICTs for Africa's future knowledge development in important fields such as public health, earth science and climate change, as well as for country competitiveness and broad social inclusiveness. Such a vision can bring institutions to focus on the value of NRENs and RRENs. These ideas were keenly taken up in the discussion forums and activities of the AAU and SARUA (when established in 2005), culminating in the agreement to establish the UbuntuNet Alliance, announced at WSIS 2005. But the work of building a collective vision does not end there.

The work of building or consolidating national and regional RENs involves a range of partners in distinctive roles. For example, UbuntuNet Alliance is a technical organisation focused on deploying the necessary fibre infrastructure to connect its member institutions, but currently lacks the necessary political support to negotiate the complex campus-politic and national regulatory environments in order to access existing fibre resources. SARUA,

on the other hand, is a facilitative organisation with the potential to marshal 'political' support at the institutional and regional level but that lacks the technical capacity to carry out any ICT implementation activities (Twinomugisha, 2007: 49). These complementary roles can be elucidated to forge a vision for a new era of research productivity.

Regional multi-country collaboration, for the purposes of delivering NRENs and RRENs, must be underpinned by a regional political consensus that mobilises the necessary policy, regulatory, funding, human and other resources. Researchers and academics must be engaged with the processes of NREN and RREN formation as the user community that will make these investments viable. Yet the kinds of issues needing to be broached are often complex and sensitive, involving competing regional and national goals, priorities and approaches. These will play out at levels beyond the ambit of the higher education sector. For example, differences of opinion between the Kenyan and South African governments as to whether EASSy should be controlled by the private sector or be an open access system have meant the two countries have taken separate paths in their quest to access bandwidth for broadband communications.

In circumstances such as these, the higher education voice must continue to make itself heard as a consistent advocate of broadband communications to support long-term developmental interests in (Southern) Africa rather than to meet a series of contingency needs, whether they be the SKA-bid or any other particular case. Southern African higher education must articulate a vision and plan for research collaboration and networking, at regional and international levels, that will guide its participation in the work of the Ubuntunet Alliance and in the projects such as AfricaConnect. This vision must incorporate an explicit view of the research role of higher education institutions with respect to the knowledge needs of the region, as well as with respect to knowledge that can be generated for the purposes of exchange with other regions of the world.

Constraint 3 National policy on research collaboration and networking

A third constraint on higher education's access to affordable high-speed connectivity, is a national policy environment in which ICT policy lacks a perspective on higher education networking needs and, conversely, higher education policy lacks a perspective on ICT and RENs as an important resource. Regrettably, there are all too many examples of governments in the SADC region restricting broadband access (and well-functioning telecommunications markets) through inertia, misconceived policy directions and inappropriate regulatory controls and institutional arrangements (Pehrson et al, 2008: 11). If SADC governments are to facilitate the development of successful NRENs and an RREN, then supportive and integrated policies and regulatory frameworks for education, science and technology and communications are essential. Public funds should leverage private sector funding for bringing in the new telecommunications infrastructure, whilst establishing the principles of open access to the telecoms backbone and undersea cable for NRENs and RRENs.

Governments in the region need to adopt policies that encourage competition in telecommunications markets, while creating the policy foundation for the operation and funding of NRENs. Furthermore, regulatory frameworks must enable accessibility, affordability and availability of the requisite ICT resources through setting the rules of the game for competition, through promoting technological convergence (ibid), and through considering measures such as cost-based pricing and low cross-border interconnection rates. Such national reform and regional harmonisation efforts will require governments to

create, fund and strengthen independent regulators in the broad communications sector (Martin, 2006b; SARUA, 2006; World Bank, 2005). These measures are necessary both to ensure the effective functioning of NRENs and of the broader telecoms landscape within which they function.

Most importantly, the purposes to which national and regional RENs will be put, in support of research collaboration and higher learning, need to be adumbrated and supported with effective public financing of higher education research agendas and evolution of public-private-development sector research activities.

Constraint 4 Cost of NREN connectivity

The fourth, ever-present constraint upon the expansion of RENs in Southern Africa (and ICTs generally) is cost: bandwidth remains expensive across the SADC region, even though costs have come down. In the past, the financing of submarine cables has tended to occur in a closed 'shareholders' club' model (Pehrson et al, 2008: 6) and this business model may continue with the introduction of new cable systems. Continued high costs support the motivation for open access models for securing broadband connectivity. However, the workability and eventual success of this approach is untested and will hold many lessons for a developing country perspective on NREN connectivity.

This debate regarding closed club versus open-access models raises two important points for universities and policy-makers: (a) It underscores the high importance of NRENs in Southern Africa serving as bandwidth consortia, thus creating economies of scale, negotiating affordable Internet access and the terms of access for member institutions, and sharing the costs of connection to international RENs; and (b) it raises the issues of effective policy and regulation as a means of obtaining affordable broadband connectivity – and of reducing the negative effects of closed models of provision.

Key performance indicator framework for Southern African NRENs and RREN – a universities' perspective

Southern African scholarly research and communication stand at the cusp of change. One of the resources required to tip research collaboration into an era of greater productivity is access to high-speed, low cost bandwidth through dedicated networks.

The importance of cooperation and collaboration within the SADC region in the interests of securing bandwidth to establish NRENs and a RREN is fully acknowledged in principle by the Southern African higher education sector and governments. However, the practice of regional co-operation and collaboration requires strengthening.

For this reason, SARUA needs to assume a set of facilitative roles and interfaces (similar roles can be extrapolated in the case of other regional and continental associations), to ensure the advocacy of RENs to all role-players within and outside the sector, and to promote the participation of member institutions in research networking and REN-related initiatives. It needs to develop a set of strategies to ensure that Research and Education Network issues remain on the agenda of regional political bodies, as well as those of national Ministries and government departments. The development of constructive relationships and alliances with governments, regulators, private sector partners and donor agencies, as well as with the governance, management, technical and operating structures of initiatives for broadband access and scientific networking, remain essential points of interaction.

Furthermore a 'watching brief' on the evolving goals, strategic objectives, funding, operational plans and functioning of NRENs and the RREN needs to be maintained, to ensure that these are clearly derived, articulated, developed and tracked.

A four-tier model for crossing the digital divide in African higher education and research is emerging, constituted as a layered design of campus level infrastructure, national RENs, regional RENs and linkages to RRENs in various parts of the globe. Key performance indicators for the evolution of this model, derived from the discussion above, would include those listed in the following matrix. This presents a view for higher education management, including academics in charge of research, teaching and libraries, to work towards and evaluate on an annual basis.

Matrix 1: KPI framework for analysing the success of RENs

Layer	KPI
	Annual reports on quantitative measures and qualitative reviews
Campus-level focus	Agenda/index of research projects utilising NREN services
	Access to bandwidth and support services through membership of a bandwidth purchasing and management consortium
	Capacity for deployment and maintenance of new ICTs and advanced teaching and research applications
	Assessment of the cost of connectivity for current and future years
NRENs	Affordable, dedicated high speed connectivity for researchers, academics and students offering fast download and upload speeds and research platform capability
	Active levels of research networking and increased participation of African scientists in regional and global knowledge production
	Emergence of strongly indigenous research agendas and outputs in tropical medicine, earth science and other research fields of local and global importance
	Success in competitive bids for globally-relevant research (for example, SKA or climate change)
	Capacity of the academic and research population to maximise the use of advanced networks for research collaboration
	Cost and sustainability of NREN operations
RRENs	Success in acting as bandwidth purchasing consortia to achieve affordable prices
	Cross-border connectivity to enable research collaboration across African countries
	Success in competitive bids for globally-relevant research by regional research teams
	Cost and sustainability of RREN operations
Linkages to other RRENs	Levels of participation in research collaborations and access to knowledge on a global scale
	Cost and sustainability of international linkages

This matrix can be expanded according to the specific needs of particular universities or higher education sectors.

Conclusion

With an estimated 262 million people living in the SADC region (AfDB, 2009: 30–31), Southern African higher education must increase its formative and transformative capabilities in its three main focus areas – teaching and learning, research and scholarship, and societal engagement. This it must do in order to foster future generations that will contribute to the construction of a 21st century economy, through fostering economic development and through creating new knowledge.

The digital divide experienced by Southern African universities is a challenge that needs to be addressed if we are to compete in the global knowledge economy. There is a shift in political will in Africa towards addressing this divide, including commitment from institutions such as the AAU and SARUA. Significant private sector initiatives have begun to provide much-needed

broadband infrastructure and capacity to the region. International donors, the European Community in particular, aim to support the continental development of regional RENS. There are, however, constraints that remain to be overcome.

The higher education sector seeks to overcome the relative isolation of African scientists and researchers, and to enable them to deploy knowledge for regional/continental development and integration. In Southern African higher education today, the focus is on leapfrogging from (still inadequate) basic ICT infrastructure to those emerging networks that provide dedicated high-speed connectivity and services to users in higher education and research institutions internationally. While universities and research institutions pioneered the use of the Internet, they now strive to overcome the relative isolation that African scientists and researchers are experiencing. Educationists, university leaders and policy-makers must adopt a frame of reference and key performance indicators for African research networking and infrastructure that will support these goals. A formative framework is presented in Matrix 1 above.

The collaborative efforts of Southern African institutions, higher education sectors and governments, along with organisations such as SARUA, Ubuntunet Alliance and DANTE, need to ensure that the digital divide is narrowed and the isolation of Southern African Universities ends. ❑

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FIVE

INSTITUTIONAL REVIEW
OPEN ACCESS AND OPEN KNOWLEDGE PRODUCTION PROCESSES: LESSONS FROM CODESRIA

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Introduction

It is common in discussions of open access to limit the issue to publications and dissemination. This conflates accessibility with recognition and representation, and supposes that competing and conflicting knowledge systems and ideas would be equally available and affordable if room were created for multiple channels of accessibility. Such enthusiasm and euphoria, while understandable, do not adequately account for the prevalent power relations that structure knowledge production into interconnecting hierarchies at local and global levels.

CODESRIA has some lessons to draw on from its experience of the past 37 years – lessons about the need to privilege and prioritise recognition and representation of the perspectives, epistemologies, and contextual and methodological diversity that inform knowledge production globally and locally; and lessons about the need to widen our understanding and discussion of 'open access' to go beyond just enabling access to knowledge and research results through a multiplicity of dissemination possibilities. It is important to discuss opening access up to different races, places, spaces, cultures, classes, generations, disciplines and fields of study.

This review presents CODESRIA, and its ever-evolving publications and dissemination policy, as a possible model to inform and inspire institutions interested in a comprehensive idea of open access in an interconnected world of local and global hierarchies, where producing and consuming difference is part and parcel of everyday life.

CODESRIA as an Open Access institution from inception

CODESRIA is, by mission, structure and character, an Open Access institution. It was created in 1973, a time characterised by the bipolar logic of a world of dichotomies and the ideologies that sustained them. From politics to culture, through economics and the social, things were often articulated in black and white and in absolutes, informed by meta-narratives of reality and humanity that knew no half measures and provided for none. Even scholarship and theorising were victims of such bipolarity, as they were expected to be either capitalist and pro-western (bourgeois/liberal), or communist and pro-Soviet Union (communist/socialist).

While most of the immediate post-independence era intellectuals in Africa were, broadly speaking, liberals or socialists intellectually (given that most of them were either trained abroad or in African schools largely tailored to reproduce foreign epistemes), they were all too conscious of the fact that the often nuanced and complex African reality was either not captured at all, or, at best, only caricatured by the meta-narratives and teleologies that dominated the scholarship of binaries and zero-sum games of the day.

Although social science is often at the service of ideologies, African intellectuals could tell that the ideologies served by the dominant social science paradigms and practices of the day did not serve the interests of the Africa(s) they knew. It is thus not surprising that among the founders

of CODESRIA were scholars like Samir Amin, who were very active in the quest for a third voice of Non-Alignment, advocated by third world scholars and politicians (Amin, 1985; Ngugi, 1986; Chinweizu, 1987; Mkandawire, 1987; P'Bitek, 1989; Mamdani, 1996; Zeleza, 1997, 2006; Mafeje, 1998; Obenga, 2001; Ki-Zerbo, 2005; Nyamnjoh, 2005).

CODESRIA was thus created as an intellectual space actively to promote, develop and sustain a specifically African dimension of that global quest for a third or alternative voice on world issues. In consonance with this ambition, the organisation tasked itself with the intellectual agenda of bringing about an African value-added proposition in social research, training, networking and dissemination of knowledge produced by African scholars on African issues (Ki-Zerbo, 1992; Hountondji, 1997; Nyamnjoh, 2004a; Zeleza & Olukoshi, 2004).[1]

To achieve this, CODESRIA, in line with its pan-African mandate, adopted, and has improved over the past 37 years, an open access model of functioning that privileges balance and representation along gender, generational, regional, disciplinary and linguistic lines, aimed at representing the realities and complexities of the African continent.

Although its natural constituency is universities and research institutes, CODESRIA draws on and promotes networking among members of various universities and professional scholarly associations, without being constrained and confined by the institutional cultures, bureaucracies and proprietary tendencies of these institutions. Its research and training programmes are organised in collaboration with these institutions and associations through a philosophy and practice of programmatic decentralisation.

On open access to publications in particular, CODESRIA monographs, conference and seminar papers, and non-current issues of journals are available in PDF format for free download from the Internet. Although its book series is not yet available for free download in the same way, its partnership with the African Books Collective in Oxford has bought initiatives such as Print on Demand, Google preview and e-books, while other initiatives such as Creative Commons licensing and CopyLeft are being considered. In addition, the organisation grants easy permission to all those publishers and networks requesting republication of its articles and book chapters for non-profit ends (Nyamnjoh, 2004b).

CODESRIA's governance structures (General Assembly, Executive and Scientific Committees) also are structured with open access in mind, through providing for recognition and representation along gender, generational, regional, linguistic and disciplinary lines in membership and themes. One of the organisation's cardinal principles has been and remains promotion of academic freedom (both from external interferences and internal contradictions amongst scholars and scholarly institutions) and social responsibility of African intellectuals.

It is also in the spirit of open access that CODESRIA encourages inter-generational conversations and networking in the form of collaborative research projects, research training and writing workshops, and mentorship initiatives.

The publications programme, set up to facilitate the dissemination of CODESRIA-supported research and scholarship, aims to, inter alia:

- *Promote greater visibility and accessibility for African scholars within and outside Africa;*
- *Build the capacity of younger scholars to engage in academic publishing through, inter alia, support for writing courses;*

1 See also the various strategic plan documents available on the CODESRIA website, http://www.codesria.org

- *Strive to be of the highest scientific quality, achieved through a rigorous peer review system;*
- *Identify, as much as possible, key institutions in Africa to host the editorial production of some of its journals for a period of time (minimum of 3 years and maximum of 5 years);*
- *Develop and maintain a creative and innovative strategy for marketing CODESRIA publications and research results in order to stay competitive in the aggressive realm of publishing* (CODESRIA, 2005: 5-8).

Publishing informed by African realities

In the social sciences, where objectivity is often distorted by obvious or subtle ideology, African scholars face a critical choice between sacrificing relevance for recognition, or recognition for relevance. The politics of the cultural economy of publishing prevents the bulk of them from achieving both recognition and relevance simultaneously. And those who seek recognition over relevance have only compounded the famine from which Africa suffers – a famine of books grounded in and relevant to the cultures of Africa. Starved of their own culture, people have difficulty garnering confidence and strength (P'Bitek, 1989; Ki-Zerbo, 1992; Mkandawire, 1997; Zeleza, 1997; Mafeje, 1998; Obenga, 2001; Nyamnjoh, 2004a&b; Adichie, 2009).

Even the most non-commercial, 'progressive' or 'independent' publishers and university presses hesitate to promote diversity of content, because they run the risk of putting themselves out of business by venturing away from the standardised, routinised and predictable menus readerships have been socialised to expect. Publishers uncritically recruit reviewers – who are arbitrators of taste, standards and knowledge – regardless of ideological leanings or cultural backgrounds. This implies that publishing is about policing ideas to ensure plurality without diversity in national, regional and global book markets. The future of African publishing must go beyond the market in its fundamentalist sense. Scholarly and other traditions are invented and reinvented. It is the place and duty of scholarly publishers, in and outside Africa, to populate a global marketplace with multiple identities and cultural conviviality and provide space for unique voices (Nyamnjoh, 2008).

Current investments in knowledge and cultural production by Africans are insufficient to ensure production informed by the lived and dynamic realities of Africans. Outside Africa, knowledge of Africa beyond popular stereotypes is poor. Given that perceptions are shaped and reshaped over time and given the importance of cultural diversity in a fast globalising world, conscious efforts should be made to develop policies aimed at eradicating 'cultural poverty' in and on Africa. Such policies should encourage the production and consumption – in Africa and the rest of the world – of cultural products created by Africans, who are crying out for the space and means to tell the stories of African creativity with dignity. This is not achievable in a context where global cultural industries are driven by the desire for profit, with few incentives for ensuring representation of the world's cultural diversity. Publishers could contribute to the eradication of cultural poverty through publication and dissemination of African books as cultural products. Publishers in and from Africa have a long way to go to provide for a rainbow continent.

Marketing and dissemination of CODESRIA publications

Distribution, the weakest link in African publishing, needs creative solutions, through existing networks and other avenues. Harnessing e-publishing and print-on-demand technology will make it possible to publish books that would otherwise be too costly to print in large quantities where markets are not assured. CODESRIA has achieved a lot in the marketing and dissemination of its publications outside of Africa, but much work remains to be done to achieve a satisfactory level of marketing and dissemination in Africa. Thanks to its partnership with African Books Collective (ABC) in the United Kingdom and Michigan State University Press (MSUP) in the USA, the organisation has managed to have almost all of its books available by Print on Demand (PoD). This means that, over and above the initial print run, books can continue to be made available for as long as there is demand for them, thanks to this new print technology spearheaded by companies such as Lighting Source. Currently CODESRIA has over 150 titles available by PoD, and all new titles are systematically available by PoD, while back titles are being progressively included.

Equally, thanks also to the partnership with ABC, CODESRIA publications are now featured under the Google Books Limited Preview Service, which makes it possible to sample sections of books online. There is evidence that these practices lead to increased sales, and together with PoD, should provide a secure source of revenue for the organisation. CODESRIA has also signed up to make books available in the form of e-books, as part of another ABC initiative. At a time of critical financial cutbacks by donors and a global economic downturn, the opportunities offered by these technological developments are most welcome.

The perennial problem of marketing and dissemination within Africa, however, remains. CODESRIA books are chronically unavailable among its immediate social research community where they are most needed. The experiment of establishing distribution agreements with booksellers in different countries has yielded few and mixed results. Where such agreements exist, CODESRIA faces difficulties retrieving the remittances when due, with problems ranging from currency convertibility to dishonesty. While there is a clear need for serious reflection on how best to establish workable agreements with booksellers in all regions or countries where it is active, the organisation could further explore more creative and innovative ways of marketing and disseminating its publications.

Future prospects for scholarly publishing at CODESRIA

CODESRIA has, over the past 37 years established itself as the leading scholarly publisher in the social sciences on the African continent. Ninety per cent of what it publishes is fed directly by the research and activities it sponsors among various social research networks, in universities and research institutes throughout the continent and increasingly in the Diaspora.

However, much remains to be done to promote research and publication in the humanities, as well as to create space for book manuscripts that do not directly result from CODESRIA-funded programmes. It is especially important, if the publications programme is expected to become intellectually (never mind financially) sustainable and competitive, aggressively to attract and maintain the best scholarship, in tune with the vision and mission of projecting African voices and perspectives, regardless of whether or not that scholarship results from CODESRIA-funded research networks.

While every social scholar should be encouraged to imbibe, internalise and reproduce the CODESRIA spirit in their intellectual and research endeavours, the organisation should by no

means be compelled to publish the results of research simply because it funded the research. To create such an impression, or not sufficiently to discourage it, would be tantamount actively to promote mediocrity and a situation whereby people receive CODESRIA funding with no desire to do more than the barest minimum.

To stay competitive and offer intellectual leadership in Africa and the rest of the world, CODESRIA must be at the forefront of quality and critical knowledge production, and this means promoting the best, most creative and innovative scholarship. Fortunately, core donors such as Swedish SIDA and SAREC no longer expect CODESRIA to publish all the outcomes of the various research activities for which they, as donors, provide funding. This is a welcome development that should enable the organisation to explore various possibilities of disseminating its research results in partnership with other African publishers and to use vehicles over and beyond the conventional channels of books and journals that are printed in hard copy.

We may live in a world where what sells is not necessarily what counts in terms of the ideals that led to the creation of CODESRIA and its Publications Programme. However, a purely commercial logic is hardly in the interest of CODESRIA, especially if such commercialisation means that value is going to be conferred primarily, if not purely, by what delivers monetary profits. Thus, if CODESRIA's mission is not to be diluted or sidestepped completely, its publications programme must embrace commercialisation only to the extent that this enables it better to market and disseminate the ideas, knowledge, perspectives, scholarship and scholars that it has over the past 37 years sought, often against formidable challenges and diversions, to promote on the continent and globally.

Conclusion

As an institution that funds, supports and publishes the research of various African institutions, networks and professional associations in the social sciences and humanities, CODESRIA is well placed to inform and draw upon developments and initiatives on open access and opening knowledge processes. Its broad-based intellectual and pragmatic approach to open access is particularly instructive, as the very question of open access should of necessity be informed by a series of other equally, if not more, important questions, namely: open access to knowledge, produced by whom, in what context and with what freedom and resources.

For open access to be meaningful, as we have noted above, questions of content and the epistemological, conceptual, methodological and contextual specificities that determine or impinge upon it are crucial. While CODESRIA's approach is still very much work in progress, there is no doubt it is relevant to the question on how best to build social science and humanities knowledge production in Africa, based on the interconnecting local and global hierarchies that shape experiences, both intellectually and practically. How well this is articulated will determine the future of open access as a critical process in the production and dissemination of knowledge about Africa. ❑

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SIX

CASE NOTES: OPEN ACCESS ADVOCACY WORKSHOP: MAXIMISING RESEARCH QUALITY AND IMPACT

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Introduction

Africa has many large and small-scale development challenges, but exhibits very low levels of research output and limited capacity to answer research questions related to these challenges (Looi, 2009).[2] According to Dr Newton Kunwendo, Malawi College of Medicine, Director of the Southern Africa Consortium for Research Excellence (SACORE):

> *The challenges to research in Africa are mostly the lack of resources and infrastructure. Local funding is inadequate, as are the number of qualified researchers able to provide training and leadership. There are also problems with Internet connectivity, research administration and getting proper laboratory facilities and equipment. Yet the major obstacle we face is probably the prevailing limited understanding about scientific research and its benefits. Science is a profession and a long-term commitment, and its returns are not always dramatic, nor immediate (cited in Looi, 2009).*

Malawi has a stock of research output in a variety of forms, including technical reports and journal articles that could have influenced policy decisions and stimulated further research. However, these documents are locked up in the offices, libraries and resource centres of the country's higher education institutions. Consequently, important policy decisions have been made without considering the available evidence. Malawi has been successful in combating the HIV/AIDS pandemic. Although reports of the success stories are available, these have not been widely disseminated within and outside the country. Lives may possibly be involved; for example, the research on prevention of mother to child transmission of HIV in Blantyre clinics could be equally valid in Lilongwe or Chiradzulu – if it were accessible.

The workshop on Open Access: Maximising Research Quality and Impact (MALICO, MAREN, SARUA, eIFL.net, 2009) brought together researchers, research managers and policy-makers, librarians and ICT specialists to discuss how to raise the visibility of research outputs from universities and research institutions in Malawi and how to build their capacities in global

1 Iryna Kuchma and Kondwani Wella report on the 'Open Access Advocacy Workshop: Maximising Research Quality and Impact' which took place at Kamuzu College of Nursing (KCN), University of Malawi in Lilongwe, on 29 and 30 October 2009, organised by the Malawi Library and Information Consortium (MALICO), the Malawi Research and Education Network (MAREN), the Southern African Regional Universities Association (SARUA) and eIFL.net. These notes are published for their potential value to researchers in the field.

2 See also the formation of the Consortium for Advanced Research Training in Africa (CARTA), http://web.wits.ac.za/NewsRoom/NewsItems/CARTA.htm

knowledge sharing. The objective of the workshop was to discuss the benefits of open access for Malawi.

'Open access is sweeping the world', proclaimed Professor Leonard Kamwanja, Pro Vice Chancellor of the University of Malawi and Chair of UbuntuNet Alliance, in his welcoming speech. He argued that this provides many opportunities for research organisations, such as MALICO, which, at its founding five years ago, planned to create an open access national digital repository of research in Malawi.

The seminar covered a wealth of diverse topics, including:

- economic, social and educational benefits to making research outputs available without financial, legal and technical barriers to access;
- how open access and institutional repositories can help to maximise the visibility of research publications and improve the quality, impact and influence of research;
- how to disseminate research results and collect and curate outputs in digital format in order to showcase the quality of research in universities.

Practical sessions addressed open access policies and copyright management, including licensing open access content to encourage re-use and sharing, and recommendations on how to plan and set up an open repository.

This report focuses on some key themes presented to the workshop.

Opening access to knowledge in Southern African universities

Many of the restrictions on access to knowledge in Africa, but particularly in the Southern Africa region, revolve around restrictive copyright practices and regulations, a lack of access to Internet-based technologies and outdated paradigms for knowledge collection and dissemination. There is also a lack of creative and effective government supported enabling environments within higher education to match the vision of African leaders for knowledge and innovation in Africa in the 21st century.

The presentation of the report *Opening access to knowledge in Southern African universities* (Abrahams et al, 2008), suggested a series of recommendations to address these challenges. It reflected on the positioning of Southern African universities in the 'knowledge society' and briefly discussed global and local knowledge production, demonstrating the abundance of knowledge versus the scarcity of access to knowledge, the contestation over 'valid forms of knowledge' and the conversion from grey literature to accredited scholarly publishing. Questions were posed and discussed regarding the value of higher education in Africa, compared with a developing country such as India, where higher education is regarded as the basis for development in the new century.

The interactive discussion that ensued on the changing practices relating to research production and dissemination raised a number of issues. Academics are increasingly using the Internet as an aid to teaching and are encouraging students to use this medium to retrieve information and undertake research. Going online is driven by the need to find quick and convenient access to information relevant to research. Journals tend to be most often cited in the student research papers, followed by conference presentations. Health and life scientists tend to cite research papers from the region, but most of the researchers in Malawi are not really aware of research and scientific outputs produced in the region. Even when these outputs are freely available in digital form, there is still a need to better organise the collections and to strengthen curricula with regional research outputs.

The discussion made it apparent that there is still a false assumption that making research outputs publicly available will lower the chances of researchers for success in the fierce competition for limited research funding and promotion. The application of knowledge was another issue raised, as there are often large gaps between theoretical studies and their practical applications. Irrigation engineering was mentioned as one area where there is a need to apply existing findings and to partner with industries to solve the problems in this field. The lack of availability of applied research consultancy reports was noted, as many of these are not placed in the public domain, but held by researchers and donor agencies.

Open Access institutional repositories in South Africa

Ina Smith, a digital librarian now based at the University of Stellenbosch, drew on the University of Pretoria Research Focus Areas to demonstrate the increased understanding of the importance of research. The presentation pointed to the increasing complexity of research questions and the need to leverage existing resources. It addressed the issue of the increased mobility of researchers who need better research exchange opportunities and seek to demonstrate the impact of research on the society in order to be better funded. To meet these needs and to gain greater impact for its research, the University of Pretoria has established UPSpace,[3] a full-text Open Access digital research repository.

In this changing research environment, research libraries need to support education innovations and research excellence, providing a seamless electronic information service to academics, along with facilities that create a conducive and stimulating environment for scholarship. To answer the concerns of researchers in Malawi, the presenter demonstrated that open access institutional repositories in South Africa have contributed to increased h-indexes[4] of the researchers. For research libraries, institutional repositories have brought new roles and responsibilities, created new communities of practice, and required a changed mind-set, greater organisational learning, teamwork and collaboration with the faculty.

Irish–African partnership for research capacity building

Niamh Brennan, Programme Manager, Research Information Systems & Services, Trinity College Library, presented data on the position of Malawi in ISI indexes, showing how in recent years the number of publications has almost doubled and the number of citations has increased significantly, strengthening the ranking of Malawi in respect of clinical medicine, immunology, microbiology, agricultural and social sciences. It was argued that this research should be available via academic libraries in Malawi through the medium of the Internet.

The presentation, a case study of Trinity College, Ireland, discussed the advantages of higher education institutions having a coherent information policy designed to address the needs of library services and e-learning, as well as a system for electronic publications and records management. Trinity's current research information system is CV-driven, with every researcher having a personal URL and research web-page with a live feed to the faculty web pages and links to research publications, e-theses, grey literature and images in the Trinity Access to Research Archive (TARA). TARA is fully integrated with a research support system

3 http://repository.up.ac.za

4 The h-index or Hirsch-index reflects the number of publications and number of citations per publication for a researcher, see http://en/wikipedia.org/wiki/H-index

and brings added value to the records, including links to research profiles, ISI citation records, links to the full text, and more. This successful model of an integrated research information system is being extended to African institutions through the Irish-African Partnership for Research Capacity Building (IAP).[5]

IAP is a three-year project (2008 – 2010) bringing together the nine universities in Ireland with universities in Malawi, Mozambique, Tanzania and Uganda, in a partnership to develop a coordinated approach to research capacity building. Among the project activities is the development of a research portal to link Irish and African universities in a virtual community. This portal is intended to support collaborative research with African universities and to provide a forum for scientific communication, a platform for electronic consultation, and a digital repository and research register in four key areas – health, education, gender and ICT.

Open Access to research in Malawi

Kondwani Wella, KCN College Librarian and eIFL-Open Access Country Coordinator in Malawi, demonstrated four cases when 'open' information is not necessarily accessible or easily retrievable. Articles published by Bunda College researchers cannot be accessed in Malawi, and the book, *Poverty in Africa*, costs far too much, while conference papers, theses and dissertations may be freely available but are not searchable. He questioned whether Malawi has embraced open access, whether all students and academics can manage information using the Internet, whether researchers still trust librarians, whether librarians are doing their job effectively given the new technologies, and whether there is the necessary level of collaboration between librarians and researchers. He argued for Malawian librarians to address their own weaknesses, not simply to argue that 'the world is unfair'.

A number of universities and colleges in Malawi were shown to already be working on open repository projects – Greenstone and DSpace repositories are being developed in Bunda College, Chancellor College, College of Medicine and Mzuzu University. DATAD[6] theses and a dissertations repository is maintained by MALICO. Furthermore, MALICO, MAREN and UbuntuNet Alliance are working to improve Internet connectivity and to strengthen collaboration between librarians, researchers, policy-makers and ICT professionals. Librarians in Malawi have been trained or retrained to embrace new paradigms. There are open source solutions available as well as government support for tertiary education, research, science and technology. With some funding for capital equipment and the strengthening of MALICO in partnership with MAREN and the National Research Council of Malawi, universities and research institutions will be able to build a national federation of open repositories to maximise the visibility of research publications and to improve the quality, impact and influence of research.

Intellectual property law restrictions, lack of faculty and researcher buy-in, lack of institutional support, and the absence of collaboration and partnerships were cited among the challenges faced.

5 http://www.irishafricanpartnership.ie/

6 DATAD is the Database of African Theses and Dissertations, held by the Association of African Universities, http://www.aau.org/datad/index.htm

Conclusion

Open access is indeed sweeping the world and many countries on the African continent. While progress is noted, as in the discussions and debates at the Malawi workshop, the posing of questions for Malawi and other southern African countries and working out responses which will bring greater accessibility to researchers, academics and students, should remain high on the agenda. The challenges are great at institutional level. However, working towards growing collaboration among higher education libraries such as in MALICO, national research and education networks such as MAREN working with UbuntuNet Alliance, national research councils and regional university associations, could foster a successful movement for change at institutional level for the benefit of researchers, universities and society at large. ❑

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SEVEN

LEGISLATIVE REVIEW

REVIEW OF IPR ACT AND REGULATIONS: INTELLECTUAL PROPERTY RIGHTS FROM PUBLICLY FINANCED RESEARCH AND DEVELOPMENT ACT, ACT NO 51 OF 2008, REPUBLIC OF SOUTH AFRICA

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Introduction

South Africa's *Intellectual Property Rights from Publicly Financed Research and Development* Act, Act No 51 of 2008 (the IPR Act) was passed on 22 December 2008. The Act's main object is to 'make provision that intellectual property emanating from publicly financed research and development is identified, protected, utilised and commercialised for the benefit of the people of the Republic' (IPR Act, 2008: s. 2(1)). The Minister of Science and Technology published corresponding draft regulations (the IPR Regulations) for comment on 9 April 2009 (DST, 2009b).[1] To date, the legislation and its attendant draft regulations have been dogged by criticism from lawyers, academics and commentators, who have, inter alia, labelled the IPR Act 'unconstitutional' and 'unworkable' (Rens, 2009) and queried whether the IPR Regulations are a 'death knell for open science in South Africa' (Gray, 2009).

This review explores critical issues that recipients of public finance for research and development, including academics, researchers and universities, are confronted with, arising from the IPR Act. The issue is raised regarding the compatibility of the IPR Act and draft regulations with South Africa's position as a developing country. The review argues that, while the Act has many flaws and may require review, there is an opportunity for the regulations to address some of the identified weaknesses.

Context and scope of application

The context for the IPR Act and Regulations is the Department of Science and Technology's Ten Year Innovation Plan aimed at fostering the rise of a knowledge-based economy through innovation (DST, 2007). It seeks to grow the size and economic impact of the national innovation system, and therefore aims to maximise the commercialisation of publicly-funded research, among other measures. The legislation is also partly a response to the recommendations of a study on research utilisation, which found that utilisation of the findings of publicly-funded research was inhibited by an existing state of 'inadequate sources of knowledge or information' and 'the secrecy around intellectual property' (NACI, 2003: ix). Among the many recommendations from the study, one recommendation focused on innovation and commercialisation policies and mechanisms (ibid: 45), although the general emphasis was on incentivising research utilisation through institutional strategy and support measures, such as

1 Revised draft regulations were circulated in September 2009, but neither the April nor the September version have been formally adopted. The issues raised in this review are pertinent to both versions of the draft regulations.

encouraging formation of research networks and promoting university-industry research linkages, rather than through legislative means (ibid: 44-51).

According to the Act, 'recipients' directly impacted by the IPR Act are those persons or institutions who undertake research and development using public funding (IPR Act, 2008: s.1), including universities and statutory institutions such as the Human Sciences Research Council, Council for Scientific and Industrial Research or the Medical Research Council (MRC). The recipients are deemed to be the owners of the intellectual property (IP) arising from such research. As such, recipients are presented with significant obligations, including assessing, recording and reporting on the benefit of such research and development for society (ibid: s. 5(j)). The Act establishes the National Intellectual Property Management Office (NIPMO), responsible for protection, management and commercialisation of publicly-funded IP.

Intellectual property under the Act means any 'creation of the mind capable of being protected by law from use by any other person, in terms of South African law or foreign law, but excludes copyrighted works such as a thesis, dissertation, article, handbook or any other publication which, …, is associated with conventional academic work' (ibid: s.1). This exclusion is important because it limits the application of the Act to the field of commercialisation.

Ownership vs public domain

Determination of ownership

Recipients of public funding are required to account for their decisions regarding ownership and statutory protection of the intellectual property and to notify NIPMO accordingly. Should the recipient choose to retain ownership, then she/he has two choices – either to commercialise the research or to place it in the public domain.

Should a recipient choose not to retain ownership, then NIPMO may itself elect to acquire ownership and pursue protection of such intellectual property (IPR Act: s.4). Where NIPMO elects not to do so, the recipient may offer ownership to any private entity that provided research funding or, in the case of no such funding, ownership may be offered to the intellectual property creators, meaning the scientists and post-graduate students working in the relevant research team (ibid).

According to the Act, this is to ensure that the research and development arising from public funds is utilised and commercialised for the benefit of the people of South Africa, as opposed to being held by the recipient without the possibility of application for public benefit (IPR Act: s.2).

The question arises whether the intellectual property creators should rank last, after the recipient institution, the state and other funders, or whether the creators should rank second after the institution. A further question is whether any state can claim the capacity to engage effectively with the commercialisation of knowledge, or whether institutions and creators should be encouraged to commercialise through a range of supportive mechanisms, as envisaged in the NACI recommendations and in section 9 (4) (b) and (c) of the Act respectively, 'provide incentives to recipients and their intellectual property creators' and 'provide assistance to institutions with (i) the establishment of technology transfer offices and related capacity-building'.

Public domain

Issues of open access to knowledge and making the research output available in the public domain are not discussed in the Act, except for the limitation on publishing (IPR Act: s. 2 (1)(f)).

The draft regulations provide some consideration of this matter. Should the recipient wish to place the research output in the public domain, prior approval must be sought from NIPMO and it must be demonstrated that the intellectual property (IP) meets certain criteria for public interest as outlined in the draft regulations (IPR Regulations: s.2 (12)-(15)). Here, NIPMO makes the final decision.

Giving an institution of government the authority to approve or disapprove such choices potentially creates a bureaucratic chasm from which ineffectual decisions may emerge. How would government officials have the relevant knowledge to make decisions across a wide range of knowledge domains, even where they may call on external expertise?

Furthermore, it imposes an undue and complex burden on academics and researchers to make the case for placing their work in the public domain – a prerogative previously enjoyed by intellectual property rights holders at will and without complexity. This point is particularly important in relation to the social sciences and humanities, and the health sciences, where research is often, by definition, public interest research, for example in the field of public health. There is an attempt to address this latter question by the creation of a royalty-free right of the state (IPR Act, s.11 (1)(e) and IPR Regulations, s.8 (3)(b)). However, the current formulation does not propose open licensing, which would create open access to IP for researchers at publicly-funded institutions.

Public domain means published work that has no copyright licensing at all and the user can use this work as they choose. On the other hand, open access uses open licensing, ie it uses the copyright system to give more freedoms than what copyright offers. This is not understood in the regulations, which make reference to open source systems (IPR Regulations, s. 2 (12)). This latter approach is usually applied to software that is developed with open source code, where the requirement is that the code must always be available for sharing.

Commercialisation of intellectual property

Commercialisation is defined in the Act as 'the process by which any intellectual property emanating from publicly funded research and development is or may be adapted or used for any purpose that may provide any benefit to society or commercial use on reasonable terms' (IPR Act 2008, s.1). Recipients are required to put in place mechanisms for protecting, developing and where applicable commercialising their IP (ibid: s.5 (1)). This includes promoting the commercialisation of the relevant intellectual property in the Republic of South Africa in the first instance, and offering preferential access to broad-based black economic empowerment (BBBEE) parties and small enterprises for the exploitation of the IP (ibid: s.11). Of interest to universities are the draft provisions for the recipient and intellectual property creators to be granted an 'irrevocable, royalty-free personal licence' for the purposes of research and teaching (IPR Regulations: s.2 (6)(8)). Furthermore, 'benefit-sharing arrangements' are envisaged between recipients and intellectual property creators (IPR Act: s.10 and IPR Regulations: s.7).

The implications of the provisions of the Act (and draft regulations) are that only recipient institutions, the state, funding organisations and creators have access to the IP. This approach excludes the concept of open innovation (Chesbrough, Vanhaverbeke & West, 2006), whereby IP may be made widely available to the broad scientific/researcher community for increasing the pace of R&D, with some reasonable limitations from a public interest perspective.

Higher education institutions are called on to establish 'technology transfer office(s)' and to develop their capacity to manage, protect and commercialise intellectual property (IPR Act, s.6). In response, the University of Cape Town is amending its intellectual property policies (UCT, no date) to correspond with its obligations under the legislation, and the University of KwaZulu-Natal has established an Intellectual Property & Technology Transfer Office (UKZN, no date). Thus the impact of the Act and regulations is far-reaching and may require the expenditure of significant resources by universities, though the value of such expenditure should be carefully considered given the varying contexts of universities with respect to the volume of potentially commercialisable research.

Development context

It is important that institutions revising intellectual property approaches and applying the decision-making powers granted under the IPR Act are cognisant of the theories and debates on intellectual property rights and access to knowledge with respect to developing countries such as South Africa. This will enable intelligent approaches to the management of intellectual property rather than mere legislative compliance. Some guidance can be taken from the Geneva Declaration on the Future of WIPO (CP Tech, 2004) signed by many scientists and academics, which highlights critical features of the access to knowledge discourse. The Declaration states that 'humanity faces a global crisis in the governance of knowledge, technology and culture' (ibid: 1). It points to the following, among others, as unfavourable intellectual property-related dispensations faced by developing countries: anti-competitive behaviour on the part of intellectual property rights-holders; barriers to 'follow-on innovation' (derivative works) by authors; and misappropriation of, and limited access to, 'social and public goods' that should be in the public domain (ibid).

In summary, the Declaration argues against a one-size-fits-all approach to intellectual property policy. The points are similar to Teljeur's argument that '[d]eveloping countries can and should have sophisticated intellectual property laws, but care needs to be taken in designing smart laws, ie laws that are firmly grounded in the framework of economic policies, provide appropriate incentives for local innovators' (Teljeur, 2003: 63).

In the recently-published South African research report African Copyright and Access to Knowledge (ACA2K) on the legal landscape impacting access to knowledge in Africa (Schonwetter, Ncube & Chetty, 2009), it is argued that a negative consequence of the IPR Act is that it prohibits the disclosure of research, while under scrutiny by bureaucrats for patentability. It is further contended in the report that this may result in significant delays in local knowledge becoming available, which is an issue of particular concern in respect of neglected diseases and other knowledge fields where local research is critical to development.

An alternative approach is presented in the 'Global strategy and plan of action on public health, innovation and intellectual property' adopted by the World Health Assembly in 2008, which proposes

> *Promoting greater access to knowledge and technology relevant to meet public health needs of developing countries,* through promoting *public access to the results of government funded research, by strongly encouraging that all investigators funded by governments submit to an open access database an electronic version of their final, peer-reviewed manuscripts (WHA (2.4)(b)).*

The ACA2K report recommends that a provision more conducive to promoting access to knowledge would have been that works resulting from government-funded research were mandated to be in the public domain or, alternatively, publicly available at no charge within a reasonable time frame, perhaps subject to reasonable exceptions (Schonwetter et al, 2009). This is sound advice at a time when electronic publishing opens up the possibilities of getting new knowledge into society within a very short time-span. The Geneva Declaration and the ACA2K Report advocate flexible intellectual property policies and approaches to intellectual property protection as favourable to the economic and development goals of developing countries versus a traditional protectionist intellectual property regime (CPTech, 2004; Schonwetter et al, 2009).

Conclusion

The responsibility on government, and therefore on researchers, to account for the use of public funds clearly requires actions that will encourage research utilisation for public benefit. Careful balancing of the rights of intellectual property owners and the benefits of broadened knowledge dissemination is necessary and called for. However, the Act may fail to support these objectives, on the grounds that it is too restrictive in its formulation of an approach to utilising intellectual property. The approach adopted appears to limit intellectual property rights and the right to commercialise to four groups, namely recipient institutions, the state, other funders and creators. This excludes those individuals or institutions in the broader national system of innovation that may have the capacity to own, protect and develop the research output through transactions with third parties.

If the concern of the policy-makers is to encourage commercialisation, or alternatively the utilisation of research for economic or public benefit, there are many possible alternatives to the approach taken in the IPR Act and Regulations. The current legislation appears to bureaucratise rather than incentivise economic and social returns on the public investment in research. It may ensue that such a policy of bureaucratisation leads to unintended consequences, including a decline in the volume of research conducted, or a decline in the volume of research made available for public benefit.

Finally, there is work to be done to align the law with the intended outcomes and to deliver a practicable, workable set of regulations. Recipients must make their views and insights known to the legislators, or face the prospect of an intellectual property regime that will in time present numerous frustrations to their central roles as producers and disseminators of knowledge. ❑

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BOOK REVIEWS COMPILATION
OPEN ACCESS BOOKS ON OPEN SCHOLARLY COMMUNICATIONS

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In the spirit of the focus of this thematic issue of the *African Journal of Information and Communication*, we explore the increasing number of open access books dealing, from a variety of perspectives, with the question of access to knowledge in a digital age in a composite book review.

The books in this review article have been selected both for their broad relevance to scholarly communications and access to knowledge (A2K), as well as for practising what they preach in that they make their full texts available online for free download, alongside print versions provided for sale. They provide examples, therefore, not only of the increased access that can be provided by Open Licences (of particular importance in resource-starved African universities), but also demonstrate the success of new business models, in which openness and free access are perceived to be compatible with conventional print publication. It is particularly encouraging to note the presence of several leading academic presses now adopting this publishing model.

As is argued in Adam Haupt's *Stealing Empire*, one of the books reviewed here, the exploration of the role of the Internet in providing access to knowledge involves a range of disciplines, including law, politics, philosophy, economics, technological engineering and communication studies. There are also lessons to be learned from what is happening across different media sectors. Equally, there is a need to address the question of intellectual property law and the power of the media from the perspective of the global South, where the question of access to scientific knowledge is likely to produce different answers to those that emerge from the dominant knowledge economies of the English-speaking North in particular.

The first book reviewed deals with the importance of the public domain, and the battle over its erosion, as corporate media try to capture profits in a changing digital environment. Next, two books deal with the impact of new technologies on research, teaching and learning in universities, exploring the potential for open access and open educational resources. Finally, a book that uses examples from the media, music and film sectors, explores the dynamics of co-option and resistance to global corporate power from a South African perspective.

Boyle, J (2008). *The public domain: enclosing the commons of the mind*. Yale University Press, New Haven and London.
Full text downloadable under a Creative Commons licence from http://www.thepublicdomain.org/
Reviewed by Andrew Rens

In *The public domain*, James Boyle, William Neal Professor of Law at Duke University, explains how the public domain, the rich common heritage on which creative work draws, has been enclosed. Boyle discusses how the public domain encompasses not just works for which copyright has expired (such as the work of Charles Dickens), but also freedoms in respect of works currently in copyright, such as using the plot of a novel. The public domain, intended to serve as a fertile field for new generations of writers and inventors, is being privatised by what Boyle terms 'the Second Enclosure' – comparing the dramatic encroachment of intellectual property rights to the forced exclusion of English and Scottish peasants from their lands.

This 'Second Enclosure' has been made politically possible by the presentation of the Internet as a 'terrible menace' to the self-styled cultural industries. Boyle's verdict, ten years after the Digital Millennium Copyright Act, is that the cost to liberty of this enclosure vastly outweighs any benefits the legislation confers on one particular industry lobby group. Although lobbyists for the Digital Millennium Copyright Act claimed that it was intended merely to secure the monopoly granted to copyright holders by existing legislation in a digital environment, the Act grants a second separate monopoly to certain classes of rights holders. This second monopoly over the technological means by which digital works can be shared is a partially successful attempt by the incumbent oligopolies of the recording and movie sectors to gain control over the far larger electronic consumer goods industry.

In presenting the enclosure of music, science and technology, Boyle clarifies the vital role that limitations in the structure of intellectual property rights play in enabling creativity, innovation and competition, the very ends which intellectual property law is apparently intended to achieve. Boyle is overtly committed to free markets, property and democracy. Writing as an expert on intellectual property, he explains how copyright, trademark and patent are intended to harness market mechanisms to facilitate free speech, demonstrating a manifest grasp of the rationale for intellectual property. It is precisely because of this commitment and expertise that his critique of the Second Enclosure is all the more damning. Boyle recounts developments and debates in the United States, presenting readers from outside the United States with a cautionary tale. This is also a history which has relevance to other countries, as the changes which Boyle describes are being aggressively exported.

Boyle reminds us that the cultural ecology resembles the natural ecology in two ways. It is both fragile and complex, with interactions that are not always visible, so that altering or destroying one part of the system can have unforeseen, even devastating consequences elsewhere in the system. The second resemblance is that current economic and legal systems have not required certain corporate actors to internalise the full costs of their actions. Everyone is affected by the degradation of the cultural environment in different ways. But once each person understands that their particular problem is due to a pervasive, if diffuse, malaise of a single system, then a united response can begin. Boyle calls for a cultural environmentalism, a movement in which entrepreneurs, librarians, computer programmers and artists unite in a common cause – the health of the cultural environment.

Although the book must deal with complexities of technology and law, Boyle makes these more approachable through powerful metaphors and a certain dry wit.

KATZ, R (ED) (2008). *THE TOWER AND THE CLOUD: HIGHER EDUCATION IN THE AGE OF CLOUD COMPUTING,* EDUCAUSE, BOULDER COLORADO.

Full text downloadable as an eBook from http://www.educause.edu/thetowerandthecloud

Reviewed by Cheryl Hodgkinson-Williams

The tower and the cloud provides a comprehensive overview of the powerful but disruptive force of information and communications technologies (ICTs) in higher education (HE). The 20 essays provide a fairly broad overview of the ever-increasing strategic role of ICTs in the core missions of higher education, focusing on HE and ICTs, the globalisation of HE, accountability; ICT governance; open information, open content, open source, and scholarship in a globally connected world.

Although the book's title may seem a little obscure for those seeking to understand issues surrounding escalating use of ICTs in research and teaching, these two themes comprise at least half the book. The book explores the interplay between the history, traditions and technology that make up the academy (the 'tower') and the truly global network higher education community offered by the unbounded nature of networked technology in the 'cloud'.

While arguing that there are many benefits for individuals, educational institutions and society from open content, Malcolm Read cautions institutions to weigh the business case for this, as the associated costs can be considerable. Costs are primarily associated with producing high-quality material, copyright clearance, quality assurance and currency of materials. Andy Lane explores some reasons why individuals and institutions create and share open content (personal fulfilment, reputation and income influence) and then tackles the question of who creates the pedagogical value of open 'educational' resources (OER).

Kristina Woolsey notes how researchers have exploited new technologies to model phenomena, gather data and represent results, but notes that lecturers and publishers, accustomed to using and reproducing print representations of expertise, have been slow to take the advantages of new media for teaching, thereby limiting the reach of teaching materials.

This book provides a useful overview for higher education policy-makers, academics and educational publishers charged with the responsibility of optimising the use of ICTs to support the key missions of higher education.

IIYOSHI, T & VIJAY KUMAR, M (EDS) (2008). *OPENING UP EDUCATION. THE COLLECTIVE ADVANCEMENT OF EDUCATION THROUGH OPEN TECHNOLOGY, OPEN CONTENT AND OPEN KNOWLEDGE,* MIT PRESS, CAMBRIDGE, MASSACHUSETTS.

Full text downloadable under a Creative Commons licence from http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=11309

Reviewed by Kevin Williams

Opening up education provides a sound, accessible introduction and guide to, as well as a cautionary tale concerning, Open Education. The text would be suitable as a course reader or

as a reference for policy-making. The 27 essays (plus introduction and summation by the editors) link considerations of technology, pedagogy and epistemology in a balanced, critical, and scholarly manner.

Essay topics range from critical reflection on extant projects (including technology design and application), through strategy and policy, and pedagogic and curricular concerns and opportunities. The focus of the work is not so much on the technologies of 'openness', but on the intellectual endeavour that must necessarily precede and accompany the deployment of such technologies (Stuart Lee's *The gates are shut: technical and cultural barriers to Open Education*, David Kahle's *Designing open educational technology*, and Diane Harley's *Why understanding the use and users of Open Education matters*).

Obstacles and challenges to the 'openness' project, including powerful vested interests (*cf*. David Wiley's 'OpenCourseWars', are realistically acknowledged in many of the essays. David Kahle argues that the foundations of open education include 'access, agency, ownership, participation and experience' (p.27).

In the light of these values, perhaps the signal criticism one would have of this text is its overwhelming Western, Northern voice. While there are explanations for this, the absence of non-Northern / non-Western voices potentially undermines the very values on which 'Openness' has been established. John Daniel, in a review quoted on the back cover, 'challenges the developing world to appropriate this most promising innovation … instead of letting it underperform as merely a mechanism for the educated elite to facilitate informal learning by the less fortunate'.

Perhaps 'access, agency, ownership, participation and experience' could have been strengthened in line with this challenge, had the so-called 'developing world' been given a voice in discussing openness?

Haupt, A (2008). *Stealing empire: P2P, intellectual property and hip-hop subversion*, HSRC Press, Cape Town.

Full text PDF download available from
http://www.hsrcpress.ac.za/product.php?productid=2219&cat=14&page=2

Reviewed by Eve Gray

Stealing empire is published by the Human Sciences Research Council (HSRC) Press in South Africa, a pioneer in open access publication of scholarly books. The strategic assumptions that the HSRC made in 2001, when it adopted this approach to meet its publishing needs, have proved to be well founded: the global reach of their publications and the volume of readership have increased substantially as a result of the combination of highly professional publishing standards and a dual open access and print approach. This has enabled the HSRC Press to overcome many of the barriers that have traditionally inhibited the dissemination of scholarly works from Africa.

At first sight, a book on hip-hop subversion might seem remote from the concerns of scholarly communication. However, the central focus of Adam Haupt's highly theorised book provides a sophisticated analysis of the impact of economic globalisation and the role of the dominant media corporations in the progressive enclosure of intellectual property rights and the erosion of the commons. This analysis could be of equal importance in scholarly communication, as the author suggests in his conclusion, where he argues that further

research could well explore the enclosure of the commons in universities, in journal publishing and scientific knowledge (p. 200).

For the theoretical underpinning of his analysis, Haupt draws principally (but certainly not exclusively) on the work of Hardt and Negri and their concept of 'Empire'. The book thus explores the ways in which power is manifested in global capitalism, and the complex ways in which this is resisted, in multiple sites rather than via the simple binaries of global South and global North, 'international' and 'local'. The revelation that this approach brings is no less striking in the analysis of the progressive enclosure of intellectual property rights and erosion of the public domain that have characterised the strategies of the media owners in recent decades, something that has been relatively well covered in other studies. This is 'stealing empire' – in the sense that what is being appropriated properly belongs in the public domain.

It is Haupt's exploration of the 'power of the multitude', of the decentralisation and mobilisation across national boundaries, of the resistance to corporate power, that offers fresh perceptions that could, for example, offer a better understanding of the hegemonic power that dominates the scholarly recognition and reward systems via corporate journal publishing.

Using examples from film and music, Haupt demonstrates the ways in which global media seek to co-opt and appropriate subversive voices, in films like *The Matrix* and in the commercialisation of hip-hop and rap music. The book then moves to the variety of ways in which these subversive voices reclaim 'empire', mobilising local voices and stealing back the commons. The Southern African case studies that Haupt draws on include online media mobilisation, culture jamming, feminist re-appropriation of cultural spaces, and radical hip-hop as political and social statement. He has a chapter on the enclosure of the commons and the reclamation of this terrain through open source and Creative Commons licensing, a chapter that provides a useful overview of developments in South Africa, as well as charting the limitations of the Creative Commons agendas from the perspective of the developing world.

Some readers might resist the level of theorisation of the argument in *Stealing empire*; however, as Professor Martin Hall argued at the launch of the book, this use of theory is in itself an act of stealing empire, given that the developing world tends to find itself the subject of theoretical analysis rather than the analyst.

Editor's Recommendations (Eve Gray)

There are a number of other important books relevant to open access and scholarly communication that are also available for open access download. These include:

Lessig, L (2008) *Remix: making art and commerce thrive in the hybrid economy* by Bloomsbury Academic, London.

Available for download at http://www.bloomsburyacademic.com/pdf%20files/Remix.pdf

In this book, more accessible than his earlier titles (which are also available for free download under open licences), Lessig, the key driver of the Creative Commons licences and a leading authority on IPR in the digital world, analyses the ways in which copyright laws are progressively being appropriated to serve corporate rather than creative interests, and how we are in the process criminalising a generation. His concern is that this is stifling the creativity of an entire generation, who, adept at using new technologies, find all their creativity

declared illegal. Lessig warns that the war on the younger generation will have dire consequences for society in the United States. He offers solutions through the use of Creative Commons licensing in a read-write culture, to make space for collaborative cultural development in a hybrid economy.

Downloads of Lessig's earlier books: *The future of ideas*; *Free culture*; and *Code version 2,0* are available free from http://www.lessig.org/blog/

BENKLER, Y (2006) *THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM,* YALE UNIVERSITY PRESS, NEW HAVEN.
Available for download and annotation at Yale University Press Books Unbound
http://yupnet.org/benkler/

Yochai Benkler's seminal work on digital culture goes beyond the question of cultural production and IPR to argue that we are at a point of systemic change in economic and social production as a result of the platform offered by the Internet. He argues that modes of social production are reshaping the way economics and markets work. This in turn offers new opportunities, particularly relevant to the developing world, to enhance individual freedom, cultural diversity, and global justice. Benkler warns, however, that this process is by no means inevitable: a systematic campaign to protect the entrenched industrial information economy of the last century threatens to derail the emerging networked information environment.

WILLINSKY, J (2005) *THE ACCESS PRINCIPLE: THE CASE FOR OPEN ACCESS TO RESEARCH AND SCHOLARSHIP,* THE MIT PRESS, CAMBRIDGE, MASSACHUSETTS.
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This is a straightforward and thorough account of the issues that challenge scholarly publishing in a digital age, exploring the arguments about access to scholarship and showing the need for commitment to a scholarship that is open and collaborative. Willinsky describes different kinds of open access publication, the contradictions of copyright law and the economic implications of open access. He pays particular attention to the role of developing countries and devotes attention to technological solutions to open access publishing. ❑

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