

International Development and Research Capacities: Increasing Access to African Scholarly Publishing

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ABSTRACT

This paper examines the evolving relationship between Canada and the African academic research community through the promotion of a concept known as Information and Communication Technology for Development (ICT4D) and with an eye to its implications for increasing the circulation of research through such means as open access (OA) publishing models. We analyze the programmatic discourse of Canada's International Development Research Centre's (IDRC) African research initiatives, and report on an IDRC research and development project assessing the means of increasing access to African scholarly journals through the use of open source software platforms and open access publishing and archiving models. Consistent with IDRC's multi-year effort to contribute directly to university-based research capacities by investing in ICT infrastructure in Africa, our survey of African editors, librarians, and faculty from five African nations reveals a similar interest in developing those capacities, despite numerous challenges, through the use of online publishing systems and OA publishing models, which hold some promise of increasing access to research published in Africa.

RÉSUMÉ

Cet article analyse l'évolution de la relation entre le Canada et la communauté de recherche africaine en avançant le concept de la Technologie de l'Information et de la Communication pour le Développement (TICpD), ainsi que de son potentiel pour augmenter la circulation de la recherche grâce à des modèles de publication comme l'accès libre. Nous analysons le discours programmatique des initiatives africaines émanant du Centre de Recherche pour le Développement International canadien (CRDI), et nous faisons le bilan d'un projet de recherche et de développement portant sur l'évaluation de moyens visant à faire croître l'accès aux revues savantes africaines, en particulier grâce à des plates-formes de logiciels libres et grâce à des modèles de publication et d'archivage en accès libre. De concert avec l'effort pluriannuel du CRDI de contribuer directement aux capacités de recherches universitaires par son investissement dans les infrastructures TIC africaines, notre sondage de rédacteurs en chef, de bibliothécaires et de chercheurs de cinq pays d'Afrique, révèle ces derniers s'intéressent à développer le genre d'outils, en dépit de nombreux obstacles, offrant la possibilité d'améliorer l'accès aux recherches publiées en Afrique, et en particulier les outils de publication en ligne ainsi que les modèles de publication en accès libre.

INTRODUCTION

Increasing research investments in African countries has been identified as a key recommendation for achieving the United Nations' Millennium Development Goals in Africa (MDG Africa Steering Group, 2008). In addition, investments in information and communications technologies (ICT) for both research and economic development have been endorsed by the Global Knowledge Partnership and the United Nations Group on the Information Society (Leye, 2009). As part of a global interest in increasing ICT infrastructure as a way to enhance social and economic participation, a strategy known as Information and Communication Technology for Development (ICT4D) has emerged in the international development community, particularly in the period since the 2003 World Summit on the Information Society (ICT4D Collective, 2009). While the ICT4D movement has identified several key areas for implementation, such as health-care, ICT4D has also been explicitly linked to research development in African universities (Colle, 2005) and open access publishing (Fourati, 2009).

With many of the themes that now make up the ICT4D strategy in mind, Canada's International Development Research Centre (IDRC) created the Acacia Initiative in 1997 to "support research on ICTs that improve livelihood opportunities, enhance social service delivery, and empower citizens while building the capacity of African researchers and research networks."¹ Now, after a decade of

funding and research (1998–2008), the Acacia Initiative’s projects have demonstrated both the potential benefits and challenges that the effective use of ICTs pose for African universities and scholarly communication. The importance of this initiative has only been increased with current moves to improve scholarly communication through efforts to increase open access to the scholarly literature, and through locally developed open access journals, with both new titles and existing print journals that are moving online and considering making their online editions OA (Willinsky, 2006).

In this article we explore the particular contribution that ICT4D might make to open access publishing in the African context through the discussion of data gathered during a Canadian-funded IDRC project titled “Strengthening Scholarly Publishing in Africa: Assessing the Potential of Online Systems” (Willinsky & Esseh, 2006). We consider the contributions and challenges posed by digital technologies for increasing and improving scholarly communication, facilitating analysis of local issues and topics, building research and review capacities, and establishing a more globally-based knowledge exchange (Carmichael & Honour, 2002). These new technologies and communication infrastructures clearly hold the potential to greatly increase access and knowledge sharing through such developments as open source (free) online publishing software (such as Open Journal Systems²) and open access publishing models (Willinsky, Fischman, & Metcalfe, forthcoming). Yet there is no shortage of challenges to be addressed, as we will make clear, in realizing a greater part of that potential in the African context.

Following Willinsky’s “access principle” (2006), we contend that “a commitment to the value and quality of research carries with it a responsibility to extend the circulation of such work as far as possible and ideally to all who are interested in it and all who might profit by it” (p. xii). We begin our discussion with a focus on several factors that influence the development of research capacity and academic productivity in sub-Saharan Africa. We then analyze the programmatic discourse of Canada’s International Development Research Centre’s (IDRC) African research initiatives. Our findings show that by adopting the digital development strategy known as ICT4D, the IDRC has embarked on a multi-year effort to invest in ICT infrastructure in Africa, much of it contributing directly to university-based research capacities and telecommunications, which is a necessary step in the ability to access the growing number of open access scholarly resources, as well as the development of open access journals in Africa. However, we note that some of the criticisms made of ICT4D apply directly to such efforts in the African university context, and we share a concern over the potential for increasing dependencies in this region.

R&D MEETS ICT4D

The amount spent on research and development (R&D) has been a common method for describing a country’s research capacities, often expressed in relation to the country’s gross national product (GNP). According to the UNESCO Institute for Statistics (2007), most non-OECD countries spend about

0.25% to 0.1% of their GNP on research and development, but “R&D intensity in sub-Saharan Africa is generally less than 0.3%, with the exception of South Africa, which invests 0.9%” (p. 3).³ However, due to the extent of international investments into Africa’s social and economic infrastructure, particularly in the area of information and communications technologies (ICT), developmental expenditures that contribute to expanding African research capacities are often not measured or reported by these R&D statistics.

Thus, we resorted to another measure, one that deals directly with research output in scholarly articles. We reviewed the publication rates for sub-Saharan African countries from the period between 1997 and 2007, using the ISI Web of Science database, which includes the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. While this index is a selected view of research output, given the careful screening of journal titles admitted,⁴ we found that the number of articles indexed by the ISI written by authors employed in any one of 45 sub-Saharan African countries rose from 6,144 in 1997 to 9,730 in 2007, a change of 58% (see Figure 1).⁵

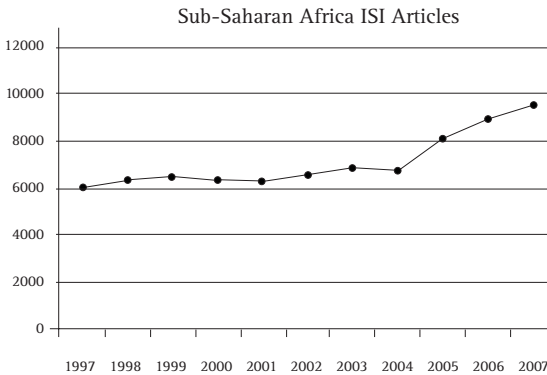


Figure 1. Journal article publication rates by author’s national affiliation for Sub-Saharan African countries, 1997-2007, as indexed by the ISI Web of Science.

A study of African Journals Online (AJOL), the world’s largest online database of African-published, peer-reviewed scholarly journals, reported that readership of this important body of African research is on the rise (INASP, 2006). Only a minority of these journals offer open access to their content, although that number is growing as AJOL extends its technical support for this approach.⁶ As well, AJOL’s Document Delivery Statistics (DDS) provides a pre-internet version of open access by sending out copies of requested articles at no cost to those working in developing countries, and a small fee for others, and it shows a steady increase in African scholarship. It also provides an indication of the global and continental interest in African scholarship. The DDS provides an important indicator of the actual use of published research from Africa, and also points to a rise in readership of African journals. The DDS data show a geographical distribution of document delivery requests fulfilled by AJOL (see Table 1).

Table 1
Geographical Distributions of Document Deliveries in AJOL

Region	Year 2003	Year 2005	Percentage Change
Africa (excluding South Africa and Nigeria)	302	1,426	372
South Africa and Nigeria	211	579	174
USA/Canada	63	152	141
Central & South America	4	53	1,225
Europe (excluding UK)	14	76	443
UK	42	54	29
Australasia	12	20	67
Asia	46	635	1,280
Total	694	2,995	332

From INASP (2006), p. 9.

The percentage increase of document delivery from Africa to Asia was 1,280% from 2003 to 2005, the highest regional increase. The percentage increase of document delivery to Canada and the US was 141% from the year 2003 to 2005. Central and South America also showed an increase in the number of African articles requested (1,225%). On the other hand, the percentage increase in document delivery within Africa was just 290%, but the total number of AJOL-indexed articles requested within Africa remains the highest overall (2,002 documents in 2005).

The rise in African representation in the ISI Web of Science and the increases shown in document delivery of African scholarship are likely due in part to the growth of the number of African journals, especially those that are indexed online in AJOL, and in the expansion of Internet connectivity throughout the continent. Both in terms of increasing communication, which in turn affects researcher collaboration, and in terms of the ability to utilize previously published research, access to the Internet has been a factor in building research capacity in developing nations (Dodania & LaPorteb, 2008; Wu, 2008). In addition, the rise in publication rates for sub-Saharan researchers over this ten-year period (1997–2007) has been influenced by particular research activities in South Africa, which has benefited from strategic, post-apartheid university mergers (Jansen, 2002). South Africa has also increased its research spending over the last decade, with an annual average growth rate of 8.5% in its gross domestic expenditure on R&D (GERD) between the years 1997 and 2004 (OECD, 2007).

Several factors affect the ability of African university researchers to disseminate their scholarship, whether through traditional print journals or online publications. Open access publishing models represent one promising direction for increasing the circulation of knowledge, although it also poses challenges for journals publishing in the developing world that involve not only infrastructure but sustainable economic models as well (Evans & Reimer, 2009). While increasing connectivity contributes greatly to research capacities in Afri-

can universities, there are important political, economic, and social conditions that must be considered before these technological developments, as well as innovative approaches such as open access, can be successfully implemented and utilized. Key among these are the political landscape, the international donor community, infrastructure and human capital development, and university-industry relationships. These are briefly described in the following section.

Political Landscape

The political environment has greatly affected the direction of research policy and research capacity development in Africa. A few years after many African countries attained political independence, they were plagued with political instability. To date, the continent's political structures have been characterized by poor governance and limited capacity for the creation, sustainability, and implementation of strategic policies (Mwiria, 2003). The frequency at which political leaders change yields a limited appreciation for the utility of long-term goal setting and policy analysis among politicians. This appears problematic if long-lasting dictatorships are taken into consideration, for example, in what used to be known as Zaire or in Ivory Coast, etc., as most of them wrestle with or become preoccupied with security and their length of term in office. This point is well articulated by Wubneh (2003):

Policy analysis can pose a threat to insecure regimes or politicians and those with vested interest. Particularly, the elite benefiting from inefficiencies and mismanagement of resources would not like to rock the boat; they would like to maintain the status quo. Policy analyses or recommendations with a likelihood of reducing or eliminating the benefits accruing to these elite are likely to be rejected; hence the underlying reason for a weak demand for use of internal capacity in policy analysis and development management. (p. 173)

In one of the few empirical studies on this subject, Wubneh identified some of the major constraints to capacity building in Africa. His study showed, in addition, that a "non-conducive economic and political environment," a "lack of funds," and "lack of necessary facilities such as library materials, computers, etc." were major constraints to academic policy formulation. The study concludes that "political instability" can result in a "constant erosion of capable and experienced senior officers at the policy formulation level" (p. 190).

Those areas in Africa currently suffering a dysfunctional political environment pose a special challenge for those committed to improving research practices in local universities. Universities in Africa are largely a post-independence phenomenon, precipitated and sustained by the dreams and demands of patriotism, nationalism, and developmentalism (Adewolewa, 2001). Universities and research institutions were seen as agents of change—to convert the once reviled "native" subjects to respected national citizens, and transform their so-

cities from underdeveloped to developed (Zezeza, 2002). For a period of time, the shared goal and aspiration of nationalist ideology by the government and scholars of higher education institutions created a symbiotic relationship between the state and the universities, which ensured extensive government funding (Teferra & Altbach, 2004). However, the deteriorating economic state of many African countries in the 70s and 80s, affected by local and global factors (such as currency fluctuations), paired with the daunting task of nation-building and the ensuing repression and starvation of higher education as well as undue interferences from the state, soon soured the relationship between the universities and the government (Adewolewa, 2001; Teferra & Altbach, 2004; Zezeza, 2002). The universities were considered by the state as having failed in their mission, perhaps because universities were seen as a source of potential opposition to military rule. Teferra and Altbach (2004) have noted, perhaps a little too harshly, that “most governments in Africa are intolerant of dissent, criticism, nonconformity, free expression and academic freedom” (p. 40). If, as Altbach (2003) has argued, academic freedom is an essential component of “world-class” higher education institutions, efforts to increase faculty autonomy and free expression should be included in research-capacity strategies. Indeed, academic freedom and a free society are important factors in the ability to sustain open access software development (Wyles, 2009) and a culture of autonomous research (Schulze, 2008), just as open access has been shown, in turn, to contribute to academic freedom (Willinsky, Murray, Kendal, & Palepu, 2007) and the growth of research readership (Hitchcock, 2009).

The International Donor Community

It is impossible to discuss African research policy and research capacity building without discussing the important role of donors and international agencies, the first and foremost being the World Bank (WB) and the International Monetary Fund (IMF). However, the counter-intuitive role played by the policies of donor organizations in the escalation of Africa’s socio-economic crisis (and thus the ability to build a formidable research capacity) has not been well-documented. One question in particular deserves greater attention: What has been the World Bank’s influence in compelling African leaders to accept conditions and to promote a neo-liberal agenda, and how has it affected not only policy formulation but also research capacity development in Africa (Munene & Otieno, 2008)?

Since the 1980s the World Bank and the IMF have consistently compelled African countries to adopt and implement structural adjustment policies designed and packaged by these donors. The first impact of WB policies was experienced through the implementation by African governments in the 1980s of what is known as the Structural Adjustment Program (SAP), coordinated with the IMF. This program included the removal of subsidies to student education, the introduction of cost-sharing measures in higher education (including user fees), the privatization and diversification of the higher education system, and

currency devaluation. Proponents of the educational reforms by the WB/IMF insist that Africa should promote primary and vocational training because Africa “lacks both intellectual and technological capacity to sustain higher education” (Federici, Caffentzis, & Alidou, 2000, p. 39). Perhaps most damningly, in terms of donor investment, the WB argued, in effect, that “higher education in Africa was a luxury...and that most African countries were better off closing universities at home and training overseas” (Brock-Utne 2003, p. 8). Only since the turn of the century has the WB begun to get behind what it now calls “knowledge societies,” placing greater emphasis on higher education around themes of “knowledge sharing” as part of its direction for future support (World Bank, 2002, p. 107).

Infrastructure and Human Capital Investments

The implementation of SAP led to the reduction of expenditure on education by 26%; enrolment rates declined, and books from primers to biology textbooks became scarce commodities (Federici, Caffentzis, & Alidou, 2000). Life on university campuses across the region was marked by overcrowded classrooms, collapsing and dilapidated buildings, a shortage of current journals and books at libraries, lack of educational supplies, and failing water and electrical systems. University faculty lived and worked in similar conditions with below subsistence wages.

Another of the WB policies, which proved counterproductive to research capacity development in the region, was the program for human capital development overseas (Brock-Utne, 2003; Thulstrup, 1994). This approach has had a negative impact on human capital development efforts of many countries in Africa. Despite the good intentions of the overseas institutions offering training to Africans, the usefulness of the acquired knowledge to the local research and innovation systems is sometimes a mismatch. Often the graduate's overseas research program has no connection with the issues of higher priority in the developing country. Upon returning, the scholars soon realize that they have become square pegs trying to fit into round holes. They are unable to use the training they received, because it lacks relevance in their home country. When disillusionment sets in because of lack of intellectual stimulation in their field of specialization, they often return to the industrialized countries where they can be more useful. Brock-Utne (2003) lamented that “the brain drain from Africa will continue, and the need for expatriates will increase [even] when institutions of higher learning are financially starved” (p. 9).

University-Industry Relationships

The link (or lack thereof) between the universities, government, and industry in Africa is a concern to many writers and policy makers (Boersma, Reinecke, & Gibbons, 2008). Most governments and policy makers in Africa have treated research, particularly that coming from the university, as an “esoteric enterprise whose real value in terms of addressing the critical and urgent problems that confront society, is not easily recognizable and appreciated” (Benneh, 2002, p. 249).

In many sub-Saharan African countries, the linkage between research and national economic development activity has been ineffective. Consequently, traditional policy models for socio-economic development have de-emphasized research capacity as the principal engine of economic growth. However, the United Nations Millennium Development Goals (MDG) provide an opportunity for partnerships between African universities and the private sector in the area of information and communication technology (ICT). Goal 8 of the MDG is “Develop a global partnership for development,” under which Target 8.F is to, “in cooperation with the private sector, make available the benefits of new technologies, especially information and communications technologies” (MDG Africa Steering Group, 2008, p. 29). The recommendation points to an area within the MDG that can benefit both research capacity efforts and scholarly publishing in sub-Saharan Africa, with obvious implications for the role that open access initiatives might play in supporting this increased capacity. The next section describes some of these efforts, which have been part of a multi-year international development strategy.

CANADA, ICT4D, AND SCHOLARLY PUBLISHING IN AFRICA

Canada’s International Development Research Centre (IDRC) and the African academic research community have begun a partnership through the promotion of ICT4D. This strategy ties academic research and knowledge dissemination to a global policy agenda (e.g., the United Nation’s Millennium Development Goals stated above) that is intended to promote international development through North-South collaboration.

IDRC in Africa

In 1970, the IDRC was created by the Canadian government “to help developing countries use science and technology to find practical, long-term solutions to the social, economic, and environmental problems they face.”⁷ During a time when support in Africa for higher education was flagging, as reviewed above, the IDRC’s mandate was to foster research activities in developing countries by funding in-country researchers and scientific infrastructure, and through cross-border collaborations with Canadian scientists and scholars. Unlike the Canadian International Development Agency (CIDA), the IDRC was not intended to operate as a relief agency or aid organization. Rather, the IDRC was designed to build scientific and technical capacities in developing nations through long-term and locally-based projects aimed at training indigenous researchers, constructing information and telecommunications networks, and fostering evidence-based local problematization met by local solutions. This “empowerment through knowledge” strategy is continued in the current programs of IDRC.

Since the mid-1970s, the IDRC has had regional offices in Africa. While the agency continues to support research and development in the areas of health,

economics, and environmental resource management, over the years it became evident that knowledge dissemination and communication were central to all of the initiatives that IDRC supported in Africa. Thus, in 1997, the Acacia Initiative was created to direct funding toward information and communications technology (ICT) capacity-building, information policy development, and knowledge dissemination.

Acacia Initiative Goals and Higher Education

Our analysis of the IDRC mission and goals for the Acacia Initiative shows that higher education holds a central position within the research themes of the program, both in terms of the stated objectives and also in the overall development framework utilized. The Initiative has three central themes: people empowerment, social service delivery, and economic development/opportunity. Open access publishing models, as well as other aspects of ICT and scholarly communications, are included in the “Digital Commons” under the first theme “People Empowerment.” Higher education is explicitly mentioned within the second theme, “Social Service Delivery,” as “Tertiary Research and Education Networking” (see Figure 2).

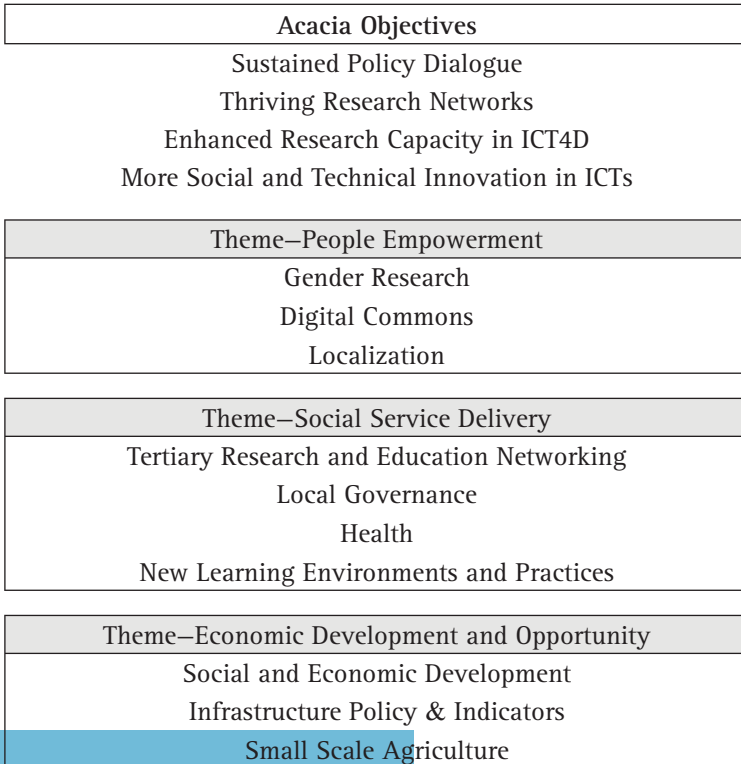


Figure 2. Acacia Initiative development framework. Adapted from IDRC, 2006.

The Acacia Initiative's *Prospectus* for 2006-2011 (IDRC, 2006) describes its emphasis on assisting higher education in Africa develop intellectual capital:

Improving research and education Internet infrastructure for tertiary institutions in Africa is therefore a necessary condition for gaining an equal footing with their counterparts around the world. It would help to create an environment that keeps African scholars home and attracts those from the North. It would help African universities fulfill their role as nurturers of the intellectual capital needed to address Africa's development challenges. (pp. 16-17)

The Acacia program's *Prospectus* describes a technological solution for building African research capacity, but it does not address the effect of IT on African research culture. In other words, the Acacia Initiative documents refer to building research networks, both scholarly and technological, but the specific focus of the ICT4D strategy for higher education is on the digital more often than the social. In many ways, the intellectual work of African researchers and the means of circulating that knowledge is overshadowed by the development of an externally-financed technological infrastructure.

Acacia Initiative's Funded Projects

In the period between 1998 and 2005, the Acacia Initiative funded 128 projects. In the Digital Commons theme, 13 projects were funded, and under the Tertiary Research and Education Networking theme, five projects were funded. While these projects represent only 14% of the total number funded by the Acacia Initiative, the role of higher education in the IDRC's development strategy is apparent, as shown in the IDRC's (2008) description of the tertiary education projects:

A solid information and communication infrastructure – that includes bandwidth comparable to that of Northern universities – could enhance the capacity of African universities to draw and retain its scholars. Notwithstanding the importance of stable political and economic contexts in African countries, improved ICTs and increased bandwidth to African universities could become more attractive places for Northern researchers and educators as well, reversing the flow of intellectual capital out of African universities and deepening the exchange of knowledge between North and South. (para. 1)

The connections between the so-called “global north” and the “global south” (Rigg, 2007) are made explicit in this description, although Canada is not identified by name as part of the North. Indeed the North/South binary may not be completely fixed, as evidenced by the rapid expansion of research capacities in South Africa noted above. As Kleine and Unwin remind us, “ICTs can be used to reinforce the position of those in power, be they individuals, companies or countries, but they can also be used to subvert that power” (2009, pp. 1060-1061).

ICT4D has increased the flow of research and scholarship from the North to the South and has served as a first step in improving the global exchange of knowledge. If left at that, with no development of local scholarly publishing capacities through local journals, the strategy of ICT4D would have the unintended consequence of reinforcing existing power inequities among knowledge societies. Altbach (2009) is among those who notes the parallels between the global aspects of science and the larger inequities of globalization:

The paradox of global science is similar to globalization in general. Globalization—through information technology, better communications, the worldwide circulation of highly trained personnel, and other factors—permits everyone to participate in the global marketplace of science, scholarship, and ideas. At the same time, globalization subjects all the participants to the pressures of an unequal global knowledge system dominated by the wealthy universities, and imposes the norms and values of those institutions on everyone. (p. 21)

Efforts have been made to increase the distribution of locally-situated knowledge to the broader academic community through open access initiatives. Programs such as HINARI, AGORA, and OARE are providing free online access to thousands of journals in life sciences, agriculture, and environmental research, respectively, to qualifying countries (Long, 2006). The International Network for the Availability of Scientific Publications (INASP) has negotiated highly reduced subscription rates for electronic access to a much wider range of journals for research libraries in the South.⁸ Once this increased access to the published literature has been made possible—albeit limited by infrastructure weaknesses that include periodic power outages, limited bandwidth availability, and a shortage of adequate computers (see for example Villafuerte-Gálvez, Curioso, & Gayoso, 2007)—the prospects of being able to draw from and build upon this research, with a focus on areas of local interest and need, have been greatly increased. A critical part of this next stage, which does not so much subvert existing power structures, as Kleine and Unwin (2009) suggest, as it creates greater balance, is the development of scholarly communication principally through journal publishing on the African continent (Teferra, 2004). The next section describes one such project in attempting to understand the current state of journal publishing and the potential for change in an “exchange of knowledge between North and South,” per the IDRC directive.

EXAMINING SCHOLARLY PUBLISHING IN AFRICA

Providing a specific instance of the IDRC policy in action and North-South collaboration, the next part of our paper describes a research and development study funded by the Acacia Initiative, which focuses on scholarly publishing in Africa using ICT. The IDRC award was carried out by the Public Knowledge Project (PKP), which is a collaboration between two Canadian universities and

one American university. The project allowed Samuel Smith Esseh, one of the authors of this paper, to conduct a study assessing the potential of online publishing systems for African scholarly publishing. The goal was to inform editors, librarians, and faculty members about the potential of these online systems that are based on the PKP's freely available open source software, Open Journal Systems (OJS), which is designed to manage and publish established and new journals online. The software reduces publishing costs and is also intended to assist journals in publishing both online and in print, and to make open access publishing a viable option for journals. At this point, OJS is being used by approximately 4,500 journals around the world. This includes close to 400 in Africa through the African Journals Online (AJOL) program which utilizes the software, although as noted above most journals are not using the software to provide open access. Still, the vast majority of journals using this software do make their content freely available, raising questions about the viability and advantages of African journals going open access as part of their online publishing strategy. This said, a small number of African journals are beginning to take this approach.

The IDRC-funded study included a series of eight workshops held in South Africa, Ghana, Nigeria, Kenya, and Uganda from 2005 to 2007. The workshops were attended by journal editors and staff, potential journal editors, librarians and library IT personnel, university IT administrators and researchers, faculty, and postgraduate students. They came from universities, university colleges, and research institutions across the continent. Although the workshops were coordinated in eight universities, the workshops were organized in such a way that universities and research institutions within traveling distance of the host institutions were all invited to participate in the workshops. In total, 312 representatives from over 32 universities and 25 research institutions participated in the workshops.

Participants were introduced to online strategies for scholarly journal management and publishing, which included a practical demonstration of how the free software (OJS) can be used to reduce costs and improve the circulation of journal content through various models of open access. Emphasis was placed on ensuring a journal's economic sustainability while increasing access to knowledge. The workshops provided participants with the opportunity to critically debate and review a series of current challenges facing scholarly publishing, as identified through online access to journals' table of contents and abstracts. Participants focused on publishing budgets, technical requirements, editorial and peer review processes, and authorship and readership benefits as they relate to open access and the current AJOL document delivery service. Finally, participants were asked to complete one of four survey questionnaires, specifically designed for editors, librarians, faculty, or IT personnel, on current publishing practices in Africa.

Results from the study indicated that although online publishing is gradually taking hold in Africa, open access publishing has not been fully embraced as the way to proceed with online publishing. Of the editors who answered the

question on the mode of journal publishing they employed, 9% stated that their journals offered immediate open access, while 7% offered delayed open access, and 84% were subscription-based journals.

Table 2
Mode of Journal Publishing (N=77)

Mode of Publication	No. of responses	Percentage responses
Open Access	7	9%
Delayed Open Access	5	7%
Subscriptions	65	84%
Total	77	100%

While there is no accurate count world wide of what percentage of journals are open access, one recent measure placed the annual scholarly output at 20% from both open access journals and authors self-archiving work published in subscription journals (Björk, Roos, & Lauri, 2008). This suggests that the African journals in this sample are not so far out of line with the degree of global embrace of open access.

What the workshops also made clear is that while it was recognized that open access publishing may well offer many benefits to developing economies, many of the workshop participants are reluctant to fully embrace this new mode of publishing because of the technological, ideological, economic, regulatory, and policy challenges that they face. In addition, lack of training and experience in working online and questions of quality assurance when journals only appear online are perceived to be barriers to moving journal production and publication in Africa entirely online. This, of course, is itself a necessary first step before considering open access publishing models.

However, workshop participants were also very clear in their support for moving toward an online publishing approach. They saw it was clearly a better alternative to print when it comes to scholarly publishing in today's world. By the same token, the librarians were one in their opinion that online publishing is a better alternative to print publishing and the libraries in Africa are in a better position to support online publishing than before. A majority of IT administrators in this study indicated that, considering the progress that African universities have made in the development of IT infrastructure within the past five years, these institutions can make a big leap in knowledge production if they embrace online publishing. The journal editors, faculty, and students agreed that online publishing is the way forward to scientific publishing in Africa. They believe that Africa can catch up with the rest of the world if scholars and publishers take advantage of what the Internet offers. On the other hand, university administrators were more sceptical about online publishing, as they felt it had not yet established, in the African context, a strong reputation of quality scholarly work. Similarly, they were also concerned that it had yet to establish a substantial record of research productivity in this context.

It is important to point out that in spite of the overwhelming agreement among participants that online publishing holds a key to African scholarship, there remains some trepidation among participants about the future of online publishing. The concerns stem from the fact that these new technologies and initiatives are coming from the North, and that this is another opportunity for the North to exploit African intellectual property. This has the effect of tempering the interest in open access models, even as the interest in building up a readership among the editors was also strongly felt. This spoke to the need to demonstrate in readily available forms, and as part of any program of support for scholarly communication, the ways in which open access is contributing to a global exchange on more equitable grounds, providing some levelling of the “access” playing field. A second, closely related source of anxiety relates to uncertainties about the sustainability of the economic model for the one channel of online publishing that seems to hold the most promise for ensuring that African research and scholarship is widely shared with the world, namely open access. One way to characterize the question that underwrote the workshops is to ask whether OA is a model that will allow African scholars to assert their financial and intellectual autonomy over the publishing system without continuing to depend on donor agencies for survival. It was made clear that open source software for scholarly publishing, as part of a global community initiative, is only one piece of the puzzle.

The larger question revolves around the legacy of the centre-periphery dichotomy (Salager-Meyer, 2008) in the research community, which is being addressed, in part, by the growth in local journals with global access. By the same token, open access and online publishing in the global North is permitting greater involvement of authors and editors throughout the world than previously possible.

For example, 2009 saw the launch of *Critical African Studies*, a journal whose “editorial office,” although virtual, is hosted by the Centre of African Studies at the University of Edinburgh. The open access model that the journal employs could permit the involvement of a great number of African and Africanist scholars throughout the world who can readily access the journal’s content without subscriptions, participating as editors, reviewers, and in other roles because of the journal’s completely online operation through the use of OJS software. However, the editorial team’s geographic location in the UK may pose world-view challenges to the world wide integration of African scholarship in the journal, particularly given the post-colonial political economy of African nations which is, interestingly, an area that the journal notes as part of its scope (Nugent, 2009). While open access can permit a greater level of global exchange within the scholarly arena, editorial practices and networks for peer review are not necessarily altered by the technology. Indeed, at times technologies are embedded within the social, political, and economic constructs of the designer more than the user (Metcalfe, 2006).

Still, it needs to be noted that the *South African Medical Journal*, as another example, continues to publish a print version available by subscription,

while making its entire contents, dating back to 1884, freely available online via their own website and that of AJOL. The *KCA Journal of Business Management* was launched in 2008 by KCA University in Nairobi as an open access journal, using open source software to set up, manage, and publish the journal entirely within a digital environment, with associate editors from a number of institutions across Kenya and editorial advisory board members from Kenya, Australia, and the United States. While online journal publishing looks promising for Africans, there remains great trepidation about the future of open access publishing models; they appear as both a promising and uncertain way forward. Opportunities to learn about, discuss, and assess developments in these new technologies, such as was afforded by this IDRC-funded study, are crucial to the African advancement of scholarly communication on a regional, continental, and global basis. ♣

CONCLUSION

Although ICT4D strategies, such as those related to Canada's IDRC, have the potential to further African dependence on world systems and funding (particularly for IT infrastructure), the potential also exists for greater participation in global knowledge production from within African higher education.

While online journals and open access publishing models rely upon information technology and telecommunications capacities, human networking is also a key component in extending the global scale of this knowledge exchange. International collaboration and cooperation for the development of technical skills, research collaborations, and social norms relating to scholarly publishing must also be developed for advancing open access models of publishing and archiving that hold great promise for extending African participation in this ideal of a global knowledge society. Toward this end, higher education institutions in sub-Saharan Africa and their research capacities are necessarily focused on both global and regional resources and influences (Lebeau, 2008).

This dual orientation of open access is not unique to Africa, but is found within higher education systems elsewhere, albeit at different levels of agency and influence within the global environment (Marginson, 2008, 2009). This influence is certainly being played out with current global initiatives aiming at increasing access to research and scholarship. The open access model may represent, at once, a universal publishing ideal and a regional challenge. This challenging ideal is perhaps best addressed through ongoing dialogue, innovative strategies and experiments, and a shared commitment to the value of sharing what we are learning as widely and fully as possible.

REFERENCES

- Adebowale, S. A. (2001). The scholarly journal in the production and dissemination of knowledge on Africa: Exploring some issues for the future. *African Sociological Review*, 5(1), 1-16.

Altbach, P. G. (2003). The costs and benefits of world-class universities. *International Higher Education*, 33. Retrieved from http://www.bc.edu/bc_org/avp/soe/cihe/newsletter/News33/text003.htm

Altbach, P. G. (2009). Peripheries and centers: Research universities in developing countries. *Asia Pacific Education Review*, 10, 15–27.

Benneh, G. (2002). Research management in Africa. *Higher Education Policy*, 15(3), 249–262.

Björk, B., Roos, A., & Lauri, M. (2008, June). *Global annual volume of peer reviewed scholarly articles and the share available via different Open Access options*. Paper presented at the ELPUB2008 Conference on Electronic Publishing, Toronto, Canada. Retrieved from <http://www.oacs.shh.fi/publications/elpub-2008.pdf>

Boersma, F. K., Reinecke, C. J., & Gibbons, M. (2008). Organizing the university-industry relationship: A case study of research policy and curriculum restructuring at the North-West University in South Africa. *Tertiary Education and Management*, 14(3), 209–226.

Brock-Utne, B. (2003). Formulating higher education policies in Africa: The pressure from external forces and the neo-liberal agenda. *Journal of Higher Education in Africa*, 1(1), 24–56.

Carmichael, P. & Honour, L. (2002). Open source as appropriate technology for global education. *International Journal of Educational Development*, 22, 47–53.

Colle, R. (2005). Building ICT4D capacity in and by African universities. *International Journal of Education and Development using ICT*, 1(1). Retrieved from <http://ijedict.dec.uwi.edu/viewarticle.php?id=13>

Dodania, S. & LaPorteb, R. (2008). Ways to strengthen research capacity in developing countries: effectiveness of a research training workshop in Pakistan. *Public Health*, 122(6), 578–587.

Edgar, B. & Willinsky, J. (2009). *A survey of scholarly journals using Open Journal Systems*. Unpublished paper, Stanford University.

Evans, J. A. & Reimer, J. (2009). Open access and global participation in science. *Science*, 323(5917), 1025.

Federici, S., Caffentzis, G., & Alidou, O. (Eds.). (2000). *A thousand flowers: Social struggles against structural adjustment in African universities*. Trenton, NJ: African World Press.

Fourati, K. (2009). Half full or half empty? The contribution of information and communication technologies to development. *Global Governance*, 15, 37–42.

Hitchcock, S. (2009). *The effect of open access and downloads ('hits') on citation impact: A bibliography of studies*. Unpublished paper, Open Citation Project. Retrieved from <http://opcit.eprints.org/oacitation-biblio.html>

ICT4D Collective. (2009). *Information and communication technologies for development*. Retrieved from <http://www.ict4d.org.uk/>

IDRC (2006). *Acacia Prospectus, 2006-2011*. Ottawa: Program and Partnership Branch, International Development Research Centre.

IDRC (2008). *Tertiary research and education networking*. Retrieved from http://www.idrc.ca/en/ev-127999-201-1-DO_TOPIC.html

International Network for the Availability of Scientific Publications (IN-ASP). (2006). *African Journals Online (AJOL): A second internal evaluation, 2003-2005*. Retrieved from <http://www.inasp.info/psi/ajol/evaluation2005/>

Jansen, J. D. (Ed.). (2002). *Mergers in higher education: Lessons learned in transitional contexts*. Pretoria, SA: Unisa Press.

Kleine, D. & Unwin, T. (2009). Technological revolution, evolution and new dependencies: What's new about ICT4D? *Third World Quarterly*, 30(5), 1045-1067.

Lebeau, Y. (2008). Universities and social transformation in sub-Saharan Africa: Global rhetoric and local contradictions. *Compare*, 38(2), 139-153.

Leye, V. (2009). Information and communication technologies for development: A critical perspective. *Global Governance*, 15, 29-35.

Long, M. (2006, August 16). HINARI-AGORA-OARE - Long Term Future [Web log post]. Retrieved from <http://www.library.yale.edu/~llicense/ListArchives/0608/msg00069.html>

Marginson, S. (2008). Global field and global imagining: Bourdieu and worldwide higher education. *British Journal of Sociology of Education*, 29(3), 303-315.

Marginson, S. (2009). Open source knowledge and university rankings. *Thesis Eleven*, 96, 9-39.

Metcalf, A. S. (Ed.). (2006). *Knowledge management and higher education: A critical analysis*. Hershey, PA: Information Science Publishing.

MDG Africa Steering Group. (2008). *Achieving the millennium development goals in Africa*. New York: Millennium Development Goals Africa Steering Group.

Munene, I. I. & Otieno, W. (2008). Changing the course: Equity effects and institutional risk amid policy shift in higher education financing in Kenya. *Higher Education*, 55(4), 461-479.

Mwiria, K. (2003). University governance and university-state relations. In T. Damtew & A. Philip (Eds.), *African higher education: An international reference handbook* (pp. 32-43). Bloomington & Indianapolis: Indiana University Press.

Nugent, P. (2009). Critical African Studies: A volunteerist manifesto. *Critical African Studies*, 1, 1-19.

OECD. (2007). *Science, technology, and industry scoreboard, 2007*. Paris: Organisation for Economic Co-operation and Development.

Rigg, J. (2007). *An everyday geography of the global south*. London: Routledge.

Salager-Meyer, F. (2008). Scientific publishing in developing countries: Challenges for the future. *Journal of English for Academic Purposes*, 7(2), 121-132.

Schulze, S. (2008). Academic research at a South African higher education institution. *South African Journal of Higher Education*, 22(3), 644-661.

Teferra, D. (2004). Striving at the periphery, craving for the centre: The realm of African scholarly communication in the digital age. *Journal of Scholarly Publishing*, 35(3), 159-171.

Teferra, D. & Altbach, P. G. (2004). African higher education: Challenges for the 21st century. *Higher Education*, 47(1), 21-50.

Thulstrup, E. W. (1994). *Scientific research for development*. World Bank, Education and Social Policy Department. Human Resources Development and Operations Policy Paper No. 25. Washington, D.C.

UNESCO. (2007). *A global perspective on research and development* (Fact sheet, number 5). Paris: UNESCO Institute for Statistics.

Villafuerte-Gálvez, J., Curioso, W. H., & Gayoso, O. (2007). Biomedical journals and global poverty: Is HINARI a step backwards? *PLoS Medicine*, 4(6), 1133-1134.

Willinsky, J. (2006). *The access principle: The case for Open Access to research and scholarship*. Cambridge, MA: MIT Press.

Willinsky, J. & Esseh, S. S. (2006). *Strengthening scholarly publishing in Africa: Assessing the potential of online systems*. IDRC funded project. Retrieved from http://www.idrc.ca/acacia/ev-116200-201-1-DO_TOPIC.html

Willinsky, J., Fischman, G., & Metcalfe, A. S. (forthcoming). Technology and higher education. In P. Altbach, R. O. Berdahl & P. Gumpert (Eds.), *American higher education in the 21st century: Social, political and economic challenges*. Baltimore, MD: Johns Hopkins University Press.

Willinsky, J., Murray, S., Kendall, C., & Palepu, A. (2007). Doing medical journals differently: Open Medicine, open access, and academic freedom. *Canadian Journal of Communication*, 32(3), 595-612. Retrieved November 25, 2008, from http://pkp.sfu.ca/files/CJC32.4_Willinsky.pdf

World Bank. (2002). *Constructing knowledge societies: New challenges for tertiary education*. Washington, DC: The World Bank. Retrieved from <http://sit-eresources.worldbank.org/TERTIARYEDUCATION/Resources/Documents/Constructing-Knowledge-Societies/ConstructingKnowledgeSocieties.pdf>

Wu, C. (2008). Scientists without borders. *Cell*, 133(4), 559-560.

Wubneh, M. (2003). Building capacity in Africa: The impact of institutional policy and resource factors. *African Development Review*, 15(2-3), 165-198.

Wyles, R. (2009). Freedom, innovation, and equity with open source software. In S. Marshall, W. Kinuthia, & W. Taylor (Eds.), *Bridging the knowledge divide: Educational technology for development* (pp. 183-198). Hershey, PA: Information Age Publishing.

Zeleza, P. T. (2002). The politics of historical and social science research in Africa. *Journal of Southern African Studies*, 28(1), 9-24.

ENDNOTES

1. Acacia Initiative, International Development Research Centre, http://www.idrc.ca/en/ev-5895-201-1-DO_TOPIC.html
2. Open Journal Systems, Public Knowledge Project (PKP), <http://pkp.sfu.ca/ojs/> Note that Willinsky is founder and director of PKP, and Esseh is an active member of the project as well.
3. In contrast, Canada spends about 2.0% of its GNP on R&D, while the United States spends 2.7% (UNESCO, 2007).
4. For the ISI Web of Science selection process for the inclusion of science journals, see <http://science.thomsonreuters.com/mjl/selection/>
5. At least one of the authors on each article was employed by an institution in the following sub-Saharan African Countries: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Congo (Zaire), Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea Bissau, Guinea, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Swaziland, Tanzania, Togo, Uganda, Zambia, and Zimbabwe.
6. A still unpublished survey of OJS users in Africa suggests that there were slightly under 100 open access titles within this group of journals (Edgar and Willinsky, 2009).
7. International Development Research Centre, http://www.idrc.ca/en/ev-8513-201-1-DO_TOPIC.html
8. INASP's Programme for the Enhancement of Research Information, <http://www.inasp.info/file/d823e4728f59bedea7b975aba08e66cd/perii-library-development.html>

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