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Open Access Initiatives in Africa — Structure, Incentives and Disincentives

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ABSTRACT

Building open access in Africa is imperative not only for African scholars and researchers doing scientific research but also for the expansion of the global science and technology knowledgebase. This paper examines the structure of homegrown initiatives, and observes very low level of awareness prevailing in the higher educational institutions and research institutes, organizations and governments. Increasing penetration of internet as well as growing proficiency in its use account for any evidence of OA movement in the region. The absence of interest and willingness of governments and policy makers to take a role in building the movement in the region makes any observed progress a fragmented one.

As we hurtle into the twenty-first century, will we be passive downloaders of content or active uploaders of meaning?[1]

INTRODUCTION

Open access (OA) is now happening everywhere in the world, including Africa.[2] Although the global pattern and level of awareness and deployment may follow the paths of digital advantage,[3] the movement has gained tremendous pace, probably due to increased global access to the internet,[4] the activities of OA promoters and the pertinence of the mission of the movement.[5] Scholars in Africa and other developing regions no longer mourn the inaccessibility to research outcomes from the developed world. This is because, on a daily basis, both older and newer in-lab and out-of-lab information materials – books, serials, gray materials and others – are uploaded onto the internet, and downloaded by other scholars and researchers. The objective of this paper is to examine the structure OA initiatives in Africa as well as incentives and disincentives to the movement. To achieve this objective, the paper briefly examines Africa's position in the global pyramid of knowledge construction and argues that Africa's untapped knowledge resources could be an opportunity to explore OA as a strategy for making African information resources part of the global knowledgebase. The paper also argues that OA visibility in Africa may be a question of serendipity — people will use any information they can find, the ubiquitous internet having made access to information very easy. Finally, the paper highlights lack of national and institutional awareness as being responsible for the low uptake of the OA movement in many of the countries in the region. To support this research, the paper relied on syntheses from DOAJ,[6] DOAR,[7] the UNESCO's[8] global assessment of OA in various parts of the world plus practitioner's experiences and available literature in the field.

AFRICA IN THE PYRAMID OF KNOWLEDGE CONSTRUCTION

Africa consists of more than 53 nations, with thousands of native languages, and a variety of ethnic and cultural diversity. A major beauty of the continent is the unprecedented abundance of human and natural resources — Africa's biodiversity remains one of the richest in the world.[9] However, Africa is confronted with poverty, political instability, corruption, diseases, armed conflicts and ethnic and tribal chauvinism, all often blamed on postcolonial woes. In the country-by-country outlook on Africa in 2009, the Organization for Economic Co-operation and Development (OECD)[10] reviewed the African economic condition and concluded that more than half of African nations are off-track of their development objectives to achieve universal primary education by 2015.

Africa is the cradle of education in the world. According to Guinness Book of Records in 1997[11] University of Al-Karaouine, at Fez in Morocco, was founded in CE 859, followed by Al-Azhar University in Egypt in CE 970. Although the early educational activities of these institutions were mainly religious, this history represents a landmark for learning. However, today, education, even at the early levels, is performing below expectation. A typical example of state of affairs of basic education in Nigeria is the information below:

With Universal Basic Education Primary Schools in northern Nigeria still located in makeshift buildings, and with some of the schools

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having only one teacher and one classroom, and pupils of all age categories massed in one class, the feasibility of 2015 deadline for education for all for all remains unreaslistic.[12]

This may be the situation in many other countries in the region. Bad foundation for basic education implies that the critical connection between science and technology and economic prosperity, food security, disease control, access to clean water, and environmental sustainability, cannot be realised.[13,14] At the level of higher education, there is a chronic lack of investment in facilities for research and teaching. Generally, Africa's situation seems to defy analysis. This is because other regions of the world that shared some similar historical; experiences with Africa are already finding ways out of their crisis while Africa remains a case of chronic underdevelopment. An example of this is that Africa, India and China are equally victims of talent hemorrhage — where their best talents live and work outside the continent. However, the latter two countries (India and China) today rank among the best emerging economies of the world. Although the African Diaspora constitute a huge source of economic succor to their home countries,[15,16] their intellectual input has not made any significant impact in African development.[17]

With the foregoing picture, it could be expected that Africa will be in the bottom of global league of science producers. In a recent analysis, Thomson Reuters showed that between 2008 and 2009, Africa produced an average of 27,000 articles in journals and other sources and that this figure is almost equal to the output of Netherlands for one year.[18] This statistics might be indicating that Africa's contribution to global scientific knowledgebase is negligible. This situation persists despite observed changes in the global research production landscape which favors emerging economies such as Brazil, Russia, India and China.[19] In this new scenario, there is a strong indication that these emerging economies are also those with evidence of growth in research.

However, Nwagwu[20] has suggested that, although science production in Africa might not be as high as would be expected, the actual volume of papers produced in the region cannot be reliably established on the basis of the content of Thomson Reuters' and other foreign databases. Unfortunately, this kind of infrastructure is not yet available. Whatever the case, the inability of the region to provide publication and innovation evidence to account for its investment in education, suggests possible failure of modern science education in the region. Africa remains a region that is lagging behind in both modern and local science and innovation. Open access, should present an opportunity for African scholars not only to learn from scholars in various parts of the world but also to share their scientific information with scholars in developed and developing countries around the world.

OPEN ACCESS, OPEN AFRICA

Open access should be viewed in Africa as a development imperative, and therefore considered as an opportunity for the countries in the region to strengthen their research capacities. Open access has the capability to open up huge opportunities by freely providing software, technical know-how, scientific knowledge and general education to countries and people that need it most, but can least afford to pay for it.[21] Open access has the capability of empowering and stimulating ordinary people to be intellectually creative. It has the promise to reduce commercial monopolies that control software standards and information production and distribution.[22] Supporting this expectation is UNESCO's 32nd General Conference[23] in 2003 which recognized that building knowledge societies and advancing knowledge-based practices is an essential component of globalization and sustainable economic growth, particularly in developing countries.

Open access provides African scholars the opportunity to express their right to share information with the people of the world in accordance with the Universal Declaration of Human Rights of 1948.[24] The opportunity offered by OA is tremendous because it is an internet driven technology and along with other information and communication technologies, is expected to reduce many traditional obstacles, especially those of time and distance for the benefit of millions of people in all corners of the world.[25] This powerful new tool will provide and enable new styles of work based on collaboration while opening up opportunities for us to share our cultures for the mutual benefit of humanity. Peter et al. put it this way:

Information, knowledge, and culture are central to human freedom and human development. How they are produced and exchanged in our society critically affects the way we see the state of the world as it might be; who decides these questions; and how we, as societies and polities, come to understand what can be done.[26]

In a general sense, Africa is open to knowledge produced elsewhere; but Africa and the rest of the world are unwittingly heedless of Africa's modern and natural scientific information resources. The most significant opportunity offered by the OA movement to Africa is the opportunity to use the ubiquitous information technology to develop and upload Africa's rich knowledge resources to the rest of the world through the World Wide Web. In spite of the huge volume of information that is downloaded by African scholars on a daily basis, the real Africa and the real African contribution to global development can only emerge when Africa is able to create, store and disseminate, and sustain its own knowledge and technology, and contribute this to world knowledge stock. Presently, what is happening is that Africans are avalanched by scientific information produced elsewhere with the expectation that such information would help them produce their own information.

This dissonance is not even recognized locally. Development strategies in the region in science and technology as well as medicine, for instance, have focused on technology acquisition and transfer from the developed to the developing world. As a result, indigenous and local initiatives are not given more than mere recognition and mention. A realistic fact may be that modern African governments, citizens and educational institutions seem to have lost confidence in the ability of their environment to meet human needs, not minding that the same knowledge practices have sustained their society till today. The extent and level of sophistication in modern science have probably intimidated African scholars from exploring their indigenous wealth of knowledge. The famed rich biodiversity of Africa remains unharnessed, and is threatened presently by the infamous climate change.

Hountoundji,[27] a philosopher of African extraction has narrated real life stories that demonstrate the limitations of modern science and technology to meet human health needs, showing that there exist opportunities for African scholars to contribute in these regards. According to Hountoundji, unexplored traditional African knowledge and techniques may have implications for the future development of the continent and the entire world. Hountoundji described ignorance about Africa's achievement in the past as a tragedy. Looking at the world today, the palliative solution to HIV/AIDS crisis, the recourse to managing high blood pressure and sickle cell anemia, and a host of other human health crises, point to the fact that deficits in the attempt of modern science to adequately meet human health needs may be partly traced to deficits in the development of science in Africa and other regions. Practically, Africa currently cannot compete favorably with the Western world in terms of science production or the quality of science output. As long as competencies of nations continue to be measured by strides in modern science, any evidence of science achievement in the region will be dwarfed by giant strides by the owners of modern science and technology.

Open access provides an opportunity to open Africa and her rich resources to the world. Science is universal but modern science is not conclusive. The gaps in modern science such as exemplified by the inability to provide answers to many health challenges like HIV/AIDS could be obvious Nobel Prize opportunities for African scholars to explore the wealth of African biodiversity and other resources to address these problems. Although older and stronger indigenous knowledge institutes exist in the United States of America,[28] the emergence of Institute of Indigenous Knowledge (IIK) in Uganda, the Institute of Natural and Traditional Knowledge located in Albuquerque, and others, show that Africans are beginning to seek for a way to open Africa to modern science.[29] Can the outcome of the research of these and other research institutes expand the chemical table, and provide explanations for indigenous practices that work, but have hitherto had no explanation? For instance, can the results of these institutes explain the active ingredients in 'water yam' that account for multiple births in Igbo Ora in Oyo State, Nigeria?[30]

Why are these observations very important in the era of OA? The pattern of prevailing OA movement emphasizes giving Africans access to scientific information, and Africans already have more than they require. The rate at which information is presently transferred from other parts of the world to Africa is so high, and could be unsettling in the near future. Africans have become passive downloaders of content. OA can be employed to reverse this trend.

INFORMATION EXCHANGE, NOT INFORMATION TRANSFER

The evangelists of OA have alluded to the opinions of the Irish literary critic, playwright and essayist George Bernard Shaw who in 1925 advocated for information exchange as a way of building and sharing expertise, skills and efficacy among the people of the world.[31] This landmark advocacy conforms to the expectations of a truly globalized world. However, what is happening in the OA era is not information exchange — rather the course of OA is focused on giving scientific information to those who do not have it, addressing perceived inequities of access. The editorial of a recent edition of *Online Information Review*[32] described the pattern of information flow as a digital information war because of the rapidity at which the developed world produces information and the rate at which the information is transferred to the developing world. Current OA practice focuses on knowledge transfer from the developed to the developing world, without the initiatives incorporating strategies to promote transfer of information produced in Africa to the developed world. It is natural, however, to expect that such initiatives should originate from Africa and by Africans since improved access to scientific information should naturally lead to increased capacity development as well as increased scientific information production. However, by the same token, if the dynamic character expected of OA in the globalizing world should occur, developed countries would be expected to consciously utilize their technology and other advantages to trigger counterbalance of their information export to developing countries.

Lunenfeld[33] has addressed this observation from a radical perspective. He said that humanity is engaged in a secret war between downloaders and uploaders – between passive consumption and active creation – and that the outcome of this war will shape our collective futures. Lunenfeld prescribes mindful downloading and meaningful uploading. Uploading and downloading are not opposite sides of the same coin. Downloading pulls data to the system; but uploading carries the implication of moving data from one system to the whole world. Almost everyone downloads but only a few upload. Africans are mainly downloaders.

We have glided gently from Web 1.0 era (did it exist?) to web 2.0 era, and we are seeing some increase in science production in Africa, but this progress is only a modicum in comparison with the strides in the developed world. When the world finally arrives at *Web n.0* era, the difference between Africa and the developed world could be light years, and at that time, Africa would have too much to download. The manifestation of this observation on global market structure has been illustrated by Anderson[34]

> *In traditional markets, if there are three competitors, the number one company will get 60 percent share, number two will get 30 percent, and number three will get 5 percent. But in markets dominated by network effects it can be closer to 95 percent, 5 percent and 0 percent. Network effects tend to concentrate power — the rich get richer … Rather than a range of products at different prices, it tends to be winner-take-all (p.132–133).*

If African governments, citizens and their higher educational institutions do not redefine their attitude to science in the region based only on the opportunities offered by OA, the movement will leave Africa less relevant than any other technology-based movement.

THE ENVIRONMENT OF OPEN ACCESS IN AFRICA

The general environment for OA in Africa is a very difficult one. Open access involves human experts, hardware and software technologies, cost and knowhow deployed within institutions and structures, and policy frameworks to guide content identification, selection and distribution, among others. Building a technology based open resources infrastructure is a scientific process, involving knowledge of the social system of science – copyright issues, licensing, and so on – as well as technologies. OA is beyond creating a website, coming up with name of journal or any other source and, thereafter, calling for papers and then distributing what has been received from and to the public. Cursory evidence shows that many Africans know about OA, but not so much about the science and technology that have developed around it.

The social and political crises in the African region are issues of global concern, and matters about scientific information access and use by researchers might be considered less relevant by policymakers than facing the challenges of education, hunger and health. In the majority of the countries, OA is an individual scholar's affair – the scholar/researcher has the sole responsibility of sourcing and using any information materials that could be found on the internet. This contrasts sharply with what happens elsewhere in the developed world. The debate about journal prices, OA, open archives and how this development would affect scientific research has attracted the attention of many governments in the developed countries. For instance, on December 10, 2003, the UK government initiated a request for opinions about pricing, market competition, OA journals, Legal Deposit Libraries, scientific fraud and malpractice.[35]

So far, there is no Africa-wide conference or workshop to either popularize OA or weave the movement into the scheme of affairs. The only discussion by the African Union about OA was on a radio station released to member countries in the region.[36] African regional educational organizations and the majority of governments on the continent have not made any statement about OA. This neglect undercuts the activities of agencies that are designed to administer universities and research institutes along with their publications and innovations. For instance, what is the OA position of Nigeria's National University Commission which manages over 125 universities in the region? Anecdotal evidence in Nigeria shows that university administrators often consider that increased access to the WWW means that scholars already have access to sufficient information required to execute their research. Moreover, many bibliometric studies suggesting that scholars in Africa do not produce high quality information that could be marketed in developed countries could also demoralize information sharing.[37]

The dystrophies of OA in the region are foundational. While some studies have recognized that many stakeholders in the continent have a low level of awareness about OA,[38] there is compelling evidence

that the challenge might be more than mere lack of awareness. Open access is based on a product, namely scientific publication, whose significance and role in national development must be understood and accepted before initiatives to promote OA may be embraced. The challenges, therefore, are more deep-seated. Do the policymakers believe that scientific publications emanating from researchers at home are really evidence of innovation and discovery? Do they believe in the capacity of research institutions in the region to develop knowledge that could stimulate discovery or that could translate to public benefits? Policy makers, in many circumstances, view the universities as government agencies and their workers as civil servants whose primary responsibility is to train manpower for the private and public sector. In the reckoning of the policy makers, the research content and outcome of the university scholars appear to be tangential to the calling of a scholar. Explanations for this bias may be partly historical, supported by recent global science management strategies; but that is exactly where any changes about the status of OA in Africa will start.

The structure of scientific undertaking in much of Africa, for instance, in Nigeria, continues to be fragmented, lacking any identifiable template. The number of higher educational institutions and professional academics in Nigeria has increased tremendously since the liberalization of the education sector in 1999. National science production capacity and its management system might be below expectation in comparison with the developed world, but the increase in the number of institutions and scholars in the past few years should be tantamount to increased publications and innovations. The rise in tenure and promotions among academics imply that these scholars are engaged in research and are developing scientific information of sufficient impact and quality to grant them higher ranks in the universities. However, the stark reality is that much of the research carried out in this region, as well as the innovations developed, are not harvested and made part of the national or world development agenda. The development agenda for many countries is rarely based on local scientific outcomes. Generally, many African economies are not true scientific economies. Governance, management and decision-making are based on any scientific activities and findings; they are rather based on heuristics, individual or committee wisdom.

South Africa, however, stands out very significantly in the African region because it has national statements about OA. The first conference on OA on African soil was held in South Africa in 2005, and this conference set the pace for OA in the country. There even exist indigenous organizations and initiatives in South Africa which have contributed in fast tracking the movement. For instance, there is an organization named *Sivulile*, which means "We are Open", in the isiXhosa language, which was established in 2005 to support OA development in South Africa through advocacy, policy, technology and research.[39] The first Institutional Repository (IR) workshop in South Africa took place in South Africa in 2005. Another major event in South Africa happened in 2006, and was organized by the Open Society Initiative for Southern Africa (OSISA). There have been OA events in other countries in the region, but they are hardly comprehensive in terms of disciplinary composition and may also not be national in scale.

STRUCTURE OF OA INITIATIVES IN AFRICA

Pinfield[40] defines OA mandate as a policy adopted by a research institution, research funder or government — that requires researchers (e.g., university faculty or research grant recipients) to make their published, peer-reviewed journal and conference papers available to consumers at no cost. OA initiatives could, therefore, be regarded as projects initiated to achieve OA mandates. This may be expressed by the number of OAR, Open Educational Resources (OER) and OAJ projects that are originating in a community, or organizations and institutions. Discussing OA initiatives in Africa is very important to establish the level of OA consciousness in the region.

The list of departments, institutions and organizations from developed countries that make scientific information available to Africa is growing by the day. Although their list is not exhaustive and omits more recent initiatives, Nwagwu and Ahmed[41] have listed international organizations expressing some sympathy for the poor access to scientific information in Africa and are executing projects to ameliorate the situation. Taken as a whole, explicit homegrown regional mandates and initiatives are not really growing. For instance, UNESCO's country by country analysis of OA situation in Africa, in some cases, only made reference to increased access to the Internet. However, there exist impressive initiatives in South Africa which is the current OA leader in the region. In this present paper, structure of OA in Africa is discussed by examining homegrown consciousness by:

(i) journals/repositories
(ii) institutions and their departments
(iii) nongovernmental organizations
(iv) national initiatives
(v) publishers and
(vi) professional associations and research groups.

Journals/repositories

Journals and their editors are both the nozzle and lasso of OA. This is because journals remain the most valuable sources of scientific information. The uptake of OA in Africa can best be examined by the number of OA journals and repositories that exist in the various countries in the region. Although the first journals to go online in Africa were not born digital, many OA journals in Africa appear to be those born digital. Taken together and based on events in the last ten years, UNESCO is very optimistic about the OA movement in Africa. According to UNESCO, there are more than 300 OA journals published in Africa, and over 40 OA repositories as of August 2012. However, the DOAJ shows a slightly different and more impressive result, for this time frame, namely that there are 384 OAJ and 51 OAR in the region. According to the DOAJ, the earliest African country to enlist in the OA movement is Egypt, with three entries in 2002, but could not continue their lead in 2003 and 2004 when the DOAJ listed South Africa with three published journals in each of the years. Subsequently, Egypt listed a higher number of published OA journals each year in comparison with any other African country. Today, Egypt has the highest number of OA journals in the region, 284 (or 74%) of the 384, compared with South Africa which has 43 (or 11%). In addition to the OA journals, there are approximately 51 repositories in Africa, representing only about 0.6% of the world's repositories. Only sixteen of the 54 countries in Africa have OAR listed in DOAR, with South Africa contributing over 35% of the repositories over Egypt which actually embraced OA movement first.[42]

The OA era is sparking off a new development that was not existent in the offline environment *vis a vis* the emergence of ubiquitous publishing houses for clusters of OA journals. A typical example is http://www.academicjournals.org/ which has more than 100 OA journals in its collection. The journals in these OA environments make their contents available free of charge to the reading public while charging authors flexible article processing fees, or waiving same when necessary. However, many of these new journals and clusters (including http://www.academicjournals.org/) have been listed as predatory by Jeffrey Beall, a Librarian at Auraria Library, University of Colorado Denver in the United States, who maintains a list of "fake" publishing houses and journals.[43] According to Beall, many of these journals originate mainly from Africa and India; they are considered predatory on grounds of the obscurity

of their locations, and editorial boards consisting of unknown people in their fields, and poor editorial quality of the published papers, among others.

This development requires a more careful investigation. Although the ease of use and low cost of internet services could lead to the birth of fake journals, but the transition to OA might be carrying along a stereotype that is deep-rooted in the offline era. Many publications from Africa in the offline era were termed gray publications, a vaguely defined concept. These gray sources whose quality and other characteristics are sometimes influenced by resource constraints are still major sources of education information in the developing countries. Although many of these so-called predatory journals and clusters might actually be fake; some might also be well meaning initiatives whose products could be considered gray, or initiatives whose proprietors are constrained by lack of OA wherewithal. Already, it could be rightly speculated that researchers from communities with low research management and evaluation consciousness, and where authority lists of journals for publications do not exist, may already be finding spaces in these predatory sources. As a result, it may require some time, but just like gray literatures, these predatory sources might also soon be cited in the high quality sources.

Institutions and their departments

Except in South Africa where all the educational institutions have OA initiatives,[44] there are very few educational institutions in other countries that have definitive policy statements and initiatives on OA in the region. All South African universities and some of the departments have initiated OA projects, either making definitive policy statements on how to share the scientific information produced by scholars in their institutions or actually setting up OA repositories. This contrasts with the situation in Nigeria, for instance, where of over 125 universities offering higher education only Covenant University has a definite policy statement on OA and only three universities namely University of Jos, University of Nigeria and Covenant University have OA repositories which are accessible via the internet. The first and second workshops ever held on OA repositories in Nigeria occurred in 2008 and 2009 and both were co-organized by the Department of Library and Information Science at Ahmadu Belo University, EIFL and the Nigerian University Libraries Consortium (NULIB).[45] These are the only major activities at an educational institutional level that could be discerned in Nigeria, although there is some evidence of awareness of the movement in many institutions.

Nongovernmental organizations

Major nongovernmental organizations evangelizing for OA in Africa are mainly from outside Africa. At home in Africa, however, there is an organization named African Journals Online (AJOL) (www.inasp.info/ajol/index.html), which provides online access to titles and abstracts of African published research, with the purpose of increasing worldwide visibility of African research. However, AJOL only plays host to journals. On the other hand, there is African Virtual University that uses modern ICTs to give institutions in sub-Saharan Africa direct access to some high quality learning resources.[46] It provides students and professionals in 17 countries free e-mail accounts and access to an online digital library with over 1000 full-text journals.

National initiatives

At the national level, many governments in Africa have not made any statement about OA to scientific information for the benefit of scholarly research in their countries. However, in South Africa, a Report on a Strategic Approach to Research Publishing in South Africa has had tremendous influence on OA activities in the country.[47] For example, the Department of Higher Education and Training endorsed the Academy of Science for South Africa's (ASSAf) report is seen in Africa as being very remarkable. Adding to this endorsement, the South African Council for Scientific and Industrial Research (CSIR) developed its own repository. Also, in collaboration with the Committee of Higher Education Librarians of South Africa (CHELSA) the National Research Foundation has created a national portal for South African theses and dissertations.[48] Despite this progression, there are still a number of barriers facing the OA advancement in South Africa. For instance, self-archiving clauses are not included in national licenses for access to e-resources and IR managers have to clear rights for every deposited item, just as many South African publishers do not have self-archiving policies. Adding to this barrier is the article processing charges issue. During present economic crisis of Africa and the world, article processing charges are not feasible for authors in South Africa because they simply cannot afford to pay the fees.

Publishers

When compared with the developed regions, Africa is not presently a liberal host to publishing houses that publish journals and other primary information sources. Hindawi Publishing Corporation in Egypt remains the most outstanding journal publishing company in Africa, producing over 300 journals.[49] Hindawi Publishing Corporation has also moved from a subscription-based journal operation to an OA publishing model, with the bulk of revenues derived from fees from authors rather than subscription charges.[50] Although there still exist big publishing houses in many other African countries such as Nigeria, the business models of these publishers have since changed in a direction that would not permit expectation of overt participation in OA initiatives. In respect of journals and other primary information sources in Nigeria, the role of publishers has been reduced to that of printing and packaging of physical information items ob cash and carry basis and which then distribute them to their users or patrons. In some cases, however, these publishing houses retain their roles of marketing and distribution of school books and occasional publications. In many other African countries, little is known about what the publishing houses are doing about OA.

Academies/professional associations and research groups

Academies of science and related organizations could play very significant roles in promoting OA in the region. The U.S. National Academy of Sciences (NAS) is a model for other societies and academies around the entire world, with its entire collection of over 2000 reports available free on the Web.[51] Again, except in South Africa where the Scientific Electronic Library Online (SciELO SA) is being managed by ASSAf, similar experiences are very scarce in other countries in Africa. The academies in some countries, for instance, Nigeria are actually very large in number and size but their roles in research management and science communication are not yet noticeable.

OPEN ACCESS IN AFRICA: INCENTIVES AND DISINCENTIVES

The major incentive of OA in much of Africa is that OA is internet-driven, and the internet is increasingly easily available and accessible. As a result, everyone that has access to the internet will have access to a large quantity of scientific information. Closely related to this is that internet proficiency is also advancing globally. Individuals are naturally picking up and using ubiquitous and free-flowing technologies which are useful for them. Open access in much of the African region cannot sufficiently be viewed from the perspective of institutional and national efforts to support scientists and scholars with access to scientific information.

However, in Africa, the OA movement has a number of disincentives which largely revolve around several structural and environmental

challenges. Many initiatives celebrated in the world as leverages to African scientific information needs are not really OA even though they provide some access to low cost information. The definitions of OA as enshrined in the Bethesda, Budapest and Berlin (BBB) declarations clearly state that authors should be given the right to translate and repost articles, not just access to papers to read. On the surface, it would be on record that scholars from Africa and others have been given access to information resources on the basis of OA philosophy; but the fact remains that removing the author rights component defeats the expectations in an OA project. Honest efforts to build human capacity in the developing world would require the full adoption and implementation of the tenets of OA by organizations and agencies, which have become famous for their magnanimity toward developing countries and their scientific initiatives. Any OA initiative targeted at strengthening science in Africa must be modeled along the line of freedom and not the line of free beer.[52]

None of the prevailing OA models, whether green or gold or hybrid is Afro-centric. Green model requires that the publisher publishes the paper and embargoes it for some time before giving authors free access and right to deposit the paper in their institutional repositories. There are some development that might make this model have adverse effect on African and other scholars. According to Nwagwu,[53] online access to science means that science is now faster than ever. The process of discovery, consensus and closure of debate has become very quick, thus enabling scientists to reach and converge with prevailing opinion faster. There is a subsequent high rate of obsolescence of scientific knowledge. Scientists and researchers who are not fast, or who are not privileged to contribute quickly might be lost at the background noise of scientific activity.[53] Scholars who are only given access to stale publications might therefore not be able to make relevant contributions to current debate — by this, scholars in Africa will remain behind the tide and lost in the background noise of scientific activity.

The prevailing gold model of the movement in which article processing charges are preferred – article charges are, in most cases, higher than cost of buying the print journal – is also further problematic for scholars from low resource regions. Simply put, African scholars and many others cannot pay article charges. Many countries and institutions in the region do not provide sufficient money to fund research, and do not also fund article charges. Also, many research papers produced by scholars in the universities in Africa are not necessarily a result of sponsorship by funding agencies. Inability to pay would mean inability to publish in the 'gold' journals. However, the journals continue to publish and distribute freely to the developing world where most of those who cannot publish in these journals live. Even when the article processing charges are waived for African scholars, the cost is listed as philanthropy, debited in the funders' financial narrative. Hence, this model takes global scientific information imbalance back to the beginning. Much of the content of the journal is not African, but the African is also paying for the article, at least, symbolically through waiver regimes.

Generally, though the concept of article processing charges is not new in Nigeria and most African countries. African scholars have always contributed money in one way or the other to publish articles, either for peer review or for processing of the papers. However, the charges are usually reduced so that authors can afford them; the journals are then sold to willing buyers to make up for the cost of production. Current APC in the OA era are very exorbitant, sometimes the cost of an article by far outstrips the cost of subscription of a whole journal. A recent study by Solomon and Björk[54] showed that willingness to waive the APC for publications was influenced by factors including country of origin of authors. It becomes important for organizations showing magnanimity to Africa in respect of access to scientific information on OA basis to adopt approaches that conform to BBB definitions of OA. This way, OA initiatives could fit the need, goals and developmental agenda of the developing countries.

Further, OA is a technology matter; any optimistic reported awareness and acceptance of technology based developments may be merely an expression of conformity to a universal norm, and not an indication of adoption and integration into national and institutional structures and fabric. While investments into ICTs directed at increasing access to information is increasing across the region, the benefits of this expansion would be more impactful and rooted if the movement is promoted by national policy rather than merely being an idea people in the academic realm have to pick up and support to do their jobs. In view of professions, industries or communities often being fundamentally resistant to new ideas, national policies are required to break boundaries, create new roles to promote new ideas.[55]

Every new technology meets new challenges, or meets old challenges in a new and more efficient way; but new technologies also create new advantages, new beneficiaries and new losers! Open access is doubtlessly technology-heavy, not only in hardware but more strategically, with regard to software. As a result, scientists from different parts of the world will embrace the technology differently as a reflection of the varied levels of technology acceptance and penetration in their communities. Considering that different societies were actually at different stages of application and implementation of the traditional publishing system before the emergence of OA technologies may also influence the state of OA in different communities, and the experiences of African countries may be located in this dilemma.

CONCLUSIONS AND RECOMMENDATIONS

More than ten years after the rise in OA declarations, and despite research evidence of the pertinence of implementing the movement in Africa, the most crucial need of the region about the movement still remains awareness building among scholars, libraries, institutions, organizations and governments at local and regional levels. This fact is clear both in the country by country analysis of UNESCO on OA in Africa and the evidence in DOAR and DOAJ as well as publications on the state of affairs on the subject. Although South Africa has moved ahead of other countries in Africa in this respect, its achievements from a continental perspective are dwarfed by the neglect of the movement in other countries.

What is required now is strategizing by scholars in and outside the region, and international organizations to design approaches that could promote awareness in the institutions, organizations and countries. Of what benefit would investment in OA be to developing countries' governments agenda for development? Passing this information to developing nations' governments and other leaders would require stepping back to elucidate the role of research on development, the need to organize research to gauge science and innovation development, and the role access to already developed knowledge could play in these regards. The following recommendations might be helpful:

1. A good starting point would be to utilize the instrument of AJOL which enjoys some prestige as the only initiative in Africa that promotes sharing of African scientific information. The organization could add to their responsibility a further task of awareness building among scholars and journals editors as well as authors who are presently the major patrons of AJOL services. How does one start an OA journal? Many authors would answer this question by creating a website and sharing scientific information through such a site without knowing the nitty–gritty of building an OA service. Awareness building could reduce the emergence of predatory journals and clusters some of which might be arising due to ignorance about the technology driven movement. AJOL could extend its awareness programs to institutions and other organizations in the region, building collaboration with organizations outside the region where necessary.

2. While the role of AJOL is laudable, there is need for emergence of more nongovernmental organizations whose focus is on OA, albeit, defining their missions fundamentally differently from AJOL. For instance, to achieve OA's expectation of increasing tropicalismo in the global knowledgebase would require NGOs that focus on disseminating African indigenous knowledge in science, technology, military and medicine as well as culture. The focus of these organizations would be to make *tropicalist* voices heard globally, projecting *tropicalist* knowledge and culture into the international arena.
3. How will awareness be achieved among academies, association of universities and professional associations, and other organizations? Most of these organizations survive on funders' magnanimity that could, not only request that these organizations make the outcomes of their researches available on OA basis, but also demand OA policies, mandates and programs as conditions for funding.
4. A more difficult group to reach are the governments, their agencies and policy makers; but an aware crop of scholars and researchers in the universities and research institutes could utilize the instrumentality of their national bodies to exert pressures on their government regarding OA policies.
5. While OAJ and OAR are emerging in the continent, there is no strong evidence of open educational resources. How then can the content and structure as well as delivery strategies of African indigenous knowledge be communicated to the world? Although many universities in the region are embracing the possibility offered by ICT in distance education, a realm in which OER plays significant roles; anecdotal evidence shows that the focus, strategies and content on the most part follow the modern science templates.
6. Another way to popularize OA in the institutions would be to expand the curriculum of library and information science schools to include OA, citation indexing, science communication and allied courses which are presently scarcely available in the universities.

REFERENCES

1. Lunenfeld, P. (2011). The Secret War Between Downloading and Uploading: Tales of the Computer as Culture Machine. MA: MIT Press.
2. UNESCO (2010). Global open access portal. Available at http://www.unesco.org/new/en/communication-and-information/portals-and-platforms/goap/access-by-region/africa/. Accessed 23 October 2012.
3. McNeill, D. The diffusion of ideas in development theory and policy. *Global Social Policy*, *1*(10), 59–84 April.
4. Laakso, M; Welling, P; Bukvova, B; Nyman, L; Björk, B, Hedlund, T (2012). The development of open access journal publishing from 1993 to 2009. *PLoS One.* Available at http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0020961, accessed 9 October 2012.
5. Morrison, H. (June, 2012). Dramatic growth of open access. Available at http://poeticeconomics.blogspot.com/2012/07/inevitability-of-open-access-june-30.html. accessed on 9 October 2012.
6. Directory of open access journals, http://www.opendoaj.org/, accessed 8 october 2012.
7. Directory of open access registries, http://www.opendoar.org/, accessed 8 october 2012.
8. See Ref 2
9. Adams, J; King C and Hook, D (2010). Global Research Report Africa. Leeds, UK: *Evidence* (A business of Thomson Reuters).
10. OECD, (2009). African economic outlook: overview. AfDB/OECD ISBN 978-92-64-06170-5.
11. The Guinness Book of Records (1998), ISBN 0 5535 7895 2, p 242.
12. Synthesis about Universal Basic Education Primary School, Agye Niger State, Network News, Nigerian Television Authority,19 October, 2012.
13. UNESCO. (2007), Science in Africa (http://www.unesco.org/science).
14. World Bank. (2011). Financing Higher Education in Africa. World Bank. Washington DC.
15. Mohamoud, A. A. African Diaspora and African development background paper for AfroNeth. Available at http://www.diaspora-centre.org/DOCS/Diaspora_Developme.pdf. Accessed 19 October 2012.
16. International Monetary Fund. (2007, June). Ghana: Selected issues. IMF Country Report No. 07/208.
17. See Ref No 9
18. See Ref No 15
19. Department of Science and Technology Government of India New Delhi (2012). Bibliometric study of India's Scientific Publication outputs during 2001–10. Available at http://www.dst.gov.in/whats_new/whats_new12/report.pdf, accessed 30 August 2012.
20. Nwagwu, Williams. E. (2012). Organising and monitoring research production and performance in Africa. Towards an Africa Citation Index. In Conteh-Morgan Miriam and Bernard Dione (Eds.), *Electronic Publishing in Africa in the Digital Era*. Dakar, Senegal: CODESRIA.
21. Gray, Eve. (2010). Access to Africa's knowledge: publishing development research and measuring value. *African Journal of Information and Communication*(10) Available at http://ahero.uwc.ac.za/index.php?module=cshe&action=viewtitle&id=cshe_846 accessed on July 18 2012.
22. See Ref No 9
23. UNESCO. (2003). UNESCO General Conference: Access to Information Essential to the Establishment of Knowledge Societies 29 September–17 October 2003 Available http://portal.unesco.org/en/ev.php-URL_ID=16639&URL_DO=DO_TOPIC&URL_SECTION=201.html. Accessed July30 2012.
24. United Nations. Universal declaration of human rights. Available at http://www.ohchr.org/en/udhr/pages/introduction.aspx, accessed 19 July 2012.
25. Lutterbeck B, Gehring RA, Bärwolff M. (eds). (2005). Open Source Jahrbuch 2005. Lehmanns Media, Berlin.
26. Peters, A., Marginson, Simon; Murphy, P. (2009). Creativity and the Global Knowledge Economy. Peter Lang Publishers: NY.
27. Hountoundji, Peter. (2007). Endogenous Knowledge: Research Trails. CODESRIA: Senegal.
28. Hiawatha Institute for Indigenous. Available in Knowledge. Available at http://www.hiawatha.syr.edu, accessed October 16 2012.
29. Knowing your roots: indigenous medicines, health knowledge and best practices. International Network of Indigenous Health Knowledge and Development: Biennial Conference, Poulsbo, Washington State, U.S.A. 24–28 May 2010. Available at https://iwri.org/inihkd/, accessed 14 October 2012.
30. Lawal O.O; Agiang, M.A and Eteng, M. (2012). Proximate and anti-nutrient composition of white Guinea yam (*Dioscorearotundata*) diets consumed in Ibarapa, South West region of Nigeria. *J. Nat. Prod. Plant Resources*, *2(2): 256–260.*
31. George Bernard Shaw quotes (Irish literary Critic, Playwright and Essayist. 1925 Nobel Prize for Literature, 1856–1950).
32. Yagüe, M. I. (2009). Digital information war *Online Information Review*, *31*(1), pp. 5–9.
33. See Ref 1.
34. Anderson, C. (2009). *Free: The Future Of A Radical Price*, Hyperion: New York, NY.
35. Hearing on Information Policy (2010) Public access to federally-funded research, information policy, census and national archives subcommittee of the House Committee on Oversight and Government Reform, 29th of July 2010. Available: http://republicans.oversight.house.gov/index.php?option=com_content&view=article&id=922%3A07-29-2010-information-policy-qpublic-access-to-federally-funded-researchq&catid=14&Itemid, accessed 7 October 2012.
36. IIIrd Ordinary Session of the African Union on Information and Communication Technologies (ICTs) 3rd-7th August 2010 Abuja, Nigeria. Available at http://www.africaneconomicoutlook.org/fileadmin/uploads/aeo/Pict_Home/OPEN%20ACCESS%20-%, accessed 5October 2012.
37. See Ref 15.
38. Rossini, C. A. (2007). The open access movement: opportunities and challenges for developing countries. Let them live in interesting times. Paper presented at the Diplo Foundation Available: http://campus.diplomacy.edu/env/scripts/Pool/GetBin.asp?IDPool=3737 accessed 17 October 2012.
39. Sivuille — Open Access in South Africa. Available at http://www.sivulile.org accessed 6 September 2012.
40. Pinfield, S. (2004). A mandate to self archive? The role of open access institutional repositories Based on a paper presented at the UKSG seminar 'Scientific Publications: Free for all?' The Geological Society, London, Tuesday 23 November 2004.
41. Nwagwu, W.E and Ahmed, A. (2009). Building open access in Africa. *International Journal of Technology Management*, *Vol(45)(1/2), pp82–101.*
42. Nwagwu, W. (2012). Open access in Africa: inches, pinches and dystrophies in the Wellhead. Paper presented during the 10th Anniversary of Berlin Open Access Declaration held in University of Stellenbosch, South Africa November 7–8 2012.
43. "Predatory" open-access scholarly publishers. http, Available at: http://www.lymeneteurope.org/forum/viewtopic.php?f=7&t=3045&start=20&sid=f27044fdb39ff269b1e9133947522929, accessed 12, September 2012.
44. See Ref No 1.
45. See Ref No 2.
46. African virtual university learning network. Available http://www.avu.org/, accessed 20 October 2012.
47. Gievers, W. (2007). *ASSAf report: a strategic approach to research publishing in South Africa summary of findings: follow-up actions, plans. Available http://www.sivulile.org/workshops/sarua2007/SARUA%20OA%20Summit%202007_Wieland%20Gevers.pdf, accessed 19 September 2012.*
48. National Research Foundation. Available at http://www.nrf.ac.za, accessed 16 August 2012
49. Hindawi publishing corporation: growing an open-access contributor-pays business model case study update 2011. Available at http://sca.jiscinvolve.org/wp/files/2009/05/iDF153-SCA_Ithaka_CaseStudies_v2_Hindawi_v1-03.pdf accessed 20 September 2012.
50. See Re No 49

51. Arunachalam, S. Information for research in developing countries — information technology, a friend or foe? *Bulletin of the American Society for Information Science and Technology*, *29*(*5*), *16–21*. http://openmed.nic.in/283/
52. Gay, J. (ed.) (2002) *Free Software, Free Society: Selected Essays of Richard M. Stallman,* GNU Press: Boston, MA.
53. Nwagwu, W. E. (2008): Online journals and visibility of science in Africa: a role for African social science citation index. International Conference on Electronic Publishing and Dissemination titled "Putting African Journals Online: Opportunities, Implications and Limits" Dakar, Senegal, 6–7 October, 2008. (Available at http://www.codesria.org/IMG/pdf/05_Williams_Nwagwu-2.pdf accessed 20 October 2012.
54. Solomon, D.J. and Björk, B. (2011). Publication fees in open access publishing: sources of funding and factors influencing choice of journal preprint *JASIST 2011*. Available at http://www.openaccesspublishing.org/apc, accessed 2 November 2012.
55. Bagehot, W. (2011). In Andy Zubko (Ed). Treasury of Spiritual Wisdom: A Collection of 10,000 Inspirational Quotations. USA: Blue Dave Foundation.