

The Open Access Movement: opportunities and challenges for developing countries. Let them live in interesting times.¹

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“If you have an apple and I have an apple, and we exchange these apples then you and I will still each have one apple. But if you have an idea and I have an idea, and we exchange these ideas, then each of us will have two ideas.”
George Bernard Shaw

“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”¹
Yochai Benkler

“Since Galileo corresponded with Kepler, the community of scientists has become increasingly international. A DNA sequence is as significant to a researcher in Novosibirsk as it is to one in Pasadena. And with the advent of electronic communications technology, these experts can share information within minutes.”²
Bits of Power

The Internet has created a revolution. The rise of the commercial Internet has changed people’s lives in a fundamental way and this is also reflected by a fundamental change in some market activities. Content industries and markets in particular have been permanently changed by digital formats and distribution. Yochai Benkler says that the change brought about the networked information environment is deep. It is structural³. Thus, it is fundamental to understand, from a developing country perspective, how the Internet changes the capacity of knowledge production, distribution and access and how this impacts scientific innovation,

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since “technological capacity, technological infrastructure, access to knowledge, and highly skilled human resources become critical sources of competitiveness in the new international division of labour.”⁴

This article addresses the impact of the Internet on scientific communication and research, focusing on how the information and communication technologies (ICTs) have affected the publishing sector and given rise to new models of knowledge distribution (such as Open Access) in science. I argue that Open Access represents the best method for the flow, interchange and production of scientific knowledge – that access to knowledge is crucial for innovation and innovation is crucial for development. And although it is the best method, Open Access is not without the potential for negative unintended consequences, especially in the developing world.

The Internet opened the possibility of breaking barriers of space, time and money, by developing an environment where people can innovate and express all the complexity of human culture. This innovation can be noticed in a very diverse range of knowledge and economics. Projects and services such as [You Tube](#), [Skype](#), [Jamendo](#), [Global Voices](#), [OhmyNews](#), the [wikis](#) and the [Free Software](#) movement are great examples. This innovation component of ICT helps to define the Information Society: a stage of the social development characterized by the capacity of its members in obtaining and share knowledge, at any moment, from any place and in a locally relevant manner.

New forms of knowledge production and distribution represent socially beneficial consequences of the expansion of ICTs. These new forms are not only about online video and photo sharing, but indeed represent opportunities as well as challenges in scientific communication. **The** ICTs-enabled knowledge trend cuts across all sciences as it impacts the international exchange of scientific data and information.⁵ Physicist, biologist, and archaeologist all use the Internet to search, publish, and communicate. And increasingly the way they search, publish and communicate has an impact on development.

As the global economy expands, control over knowledge⁶ and information progressively determines global wealth and power. This is echoed in the WSIS statement: “We recognize that **science** has a central role in the development of the Information Society. Many of the building blocks of the Information Society are the result of scientific and technical advances made possible by the sharing of research results.”⁷

The acquisition and production of scientific knowledge is a cumulative process that depends on: “(1) human input – people, their brains, their time, their labor, and so on; (2) physical input – the buildings, the computers, the laboratories, the equipment material, and so on; and (3) the information input.”⁸ The informational input is founded on researchers’ continuing ability to access, collect and share data, primary scientific and technical literature and know-how. Here is where ICTs play a central role since they “reduce many traditional obstacles, especially those of time and distance (...) for the benefit of millions people in all corners of the world”⁹, providing powerful new tools and enabling new styles of work based on collaboration¹⁰.

However, those benefits disproportionately come to the developed world, and developing countries still face the great barrier of the “digital divide.” The digital divide is the result of different levels of adoption of technology between developed and developing countries, which can increase the gap between the have and have-not¹¹. For example, people that have access to high speed Internet at home can take more advantage of the opportunities offered by the ICTs than people who have to walk miles to access through dial-up. Furthermore, scientists in the developing world are less likely to have resource-rich libraries subscribing to journals as a historical tradition (i.e., by having physical copies in libraries). This situation forces individuals in the developing world and scientists in particular to overcome parallel hurdles: **physical access to the Internet and ICTs and knowledge access through subscription rights to content.**

Thus, it is important to prevent the digital divide in science and to work toward a single solution for both forms of access. This interdisciplinary approach will only be

sustained within communities if “a model and methodology of engaging communities to develop and articulate their own visions and goals of information access and, ultimately, an indigenous approach toward cultural, political, and economic aspects of development”¹² is adopted.

In this sense, ICTs can be conceptualized as an appropriate technology¹³ to address the problem of global informational imbalance. At the iCommons Summit in Rio in June 2006, Brazilian Minister of Culture Gilberto Gil challenged developing nations to embrace their ‘tropicalisms’ (their own cultural differences and diversity) and to use the ICTs to make their voices heard globally, projecting their own knowledge and culture into the international arena. Tropicalismo is an idea that resonates in science as well as culture, as science is part of culture. Thus the embrace of science should be part of tropicalismo, and the embrace of science is directly connected to the idea of access to science.

Open Access (OA) is part of this greater revolution in knowledge generation and distribution allowed by the ICT expansion and has the potential to empower individuals, communities and institutions, contributing to development and wealth in the patterns proposed by the Information Society. **In this sense, Open Access is an appropriate model for knowledge transfer, since:**

Basic scientific research fuels most of our nation's — and the world's — progress in science. Society uses the fruits of such research to expand the world's base of knowledge and applies that knowledge in myriad ways to create new wealth and to enhance the public welfare. Yet few people understand how scientific advances have made possible the ongoing improvements that are basic to the daily lives of everyone. Fewer still are aware of what it takes to achieve advances in science, or know that the scientific enterprise is becoming increasingly international in character. Freedom of inquiry, the full and open availability of scientific data on an international basis, and the open publication of results are cornerstones of basic research (...) By sharing and exchanging data with the international community and by openly publishing the results of research, all countries (...) have benefited.¹⁴

Open Access is a knowledge distribution model by which scholarly, peer-reviewed journal articles are made freely available to anyone, anywhere over the Internet. In the era of print, open access was economically and physically impossible. Indeed, the lack of physical access and the lack of knowledge access were the same – without physical access to a well-stocked library, knowledge access was impossible. ICTs change that. Physical access to the ICTs is much easier than access to a library with all journals subscribed, but knowledge access is still very restricted. OA changes that in turn, as ICTs changed physical access.

The first definition of Open Access comes from the [Budapest Open Access Initiative](#):

By ‘open access’ to [the] literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited.”¹⁵

In Open Access the old tradition – to publish for the sake of inquiry, knowledge and peer acclaim – and a new technology – the Internet – have converged to make possible an unprecedented public good: “the world-wide electronic distribution of the peer-reviewed journal literature”¹⁶.

There are two ways to achieve Open Access. One is to publish in a journal that confirms with the definition cited above, some times called the “gold road”¹⁷.” The second way is when an author makes a copy of her own work freely available through personal or institutional repositories¹⁸ (author [self-archiving](#)¹⁹ or the “green road”)²⁰.

Open Access is a reaction to the persistence (in the face of ICT revolution) of traditional models in scientific knowledge distribution, which were characterized by centralized and high cost journals²¹. Regarding these traditional models, Yochai Benkler affirms:

Here [Scientific publication sector], the existing market structure is quite odd in a way that likely makes it unstable. Authoring and peer review, the two core value-creating activities, are done by scientists who perform neither task in expectation of royalties payment. The model of most publications, however, is highly proprietary. A small number of business organizations, like Elsevier Science, control most of the publications. Alongside them, professional associations of scientists also publish their major journals using a proprietary model. Universities, whose scientists need access to the papers, incur substantial cost burdens to pay for the publication as a basic input into their own new work.²²

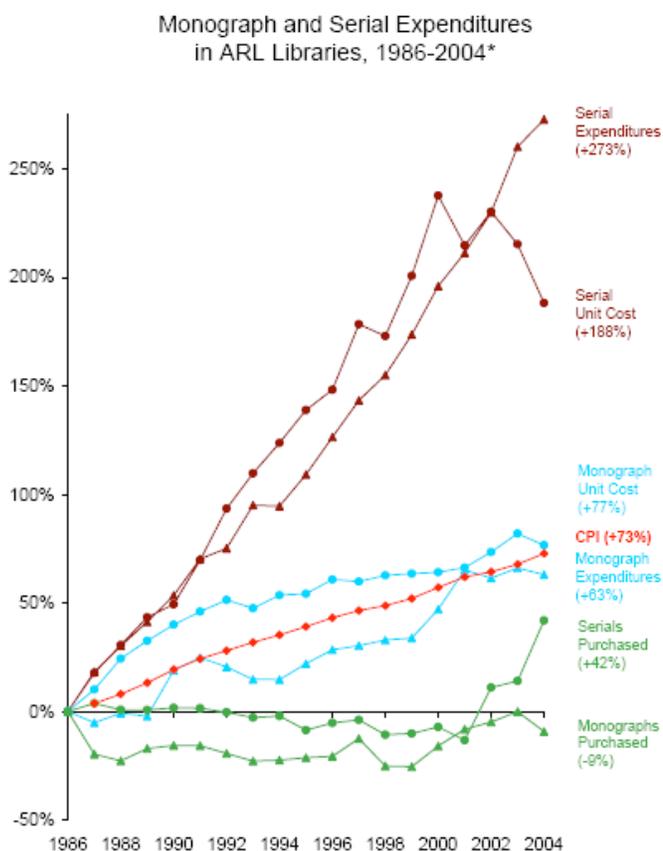
Scientists who live in the developing world have long remained on the periphery of the global research community. The reasons for this are many, including inadequate educational infrastructure, brain drain to the developed world and high journal prices. Thus Open Access is not the complete solution to the research imbalance, but represents a major opportunity to make the developing world scientist an equal to the scientist in the developed world as regards digital information – one of the three essential elements to production of scientific knowledge and innovation.

The migration of journals to truly digital technologies has two main advantages: reduces costs (printing, storage and distribution) **and enlarge the market** (as the digitized content transcends geographic borders). However, these advantages are not being passed to the users in the form of decreasing prices. As noted in Figure 1, the price of traditional scientific journals continues to increase, even though, in theory, prices should drop as costs drop. In an April 19, 1999 press release by the American Library Association, it was reported that 14 of the 26 editorial board's members of the Journal of Academic Librarianship tendered their resignations in protest over increased prices imposed by Reed Elsevier, which purchased the journal from JAI Press in October 1998.

One potential reason for this is market consolidation: a relatively small number of commercial publishers, after a process of mergers and acquisitions, control an ever increasing percentage of serial titles. An example of this is the 2007 acquisition of Blackwell Publishing

(a publisher of scientific, technical, and medical (STM) journals) by John Wiley and Sons. The combined company controls more than 1,200 titles, many of them scholarly society journals.²³

Figure 1²⁴



Furthermore, a striking irony is that scientific traditional journals start to be digitized, launching a promise of better access, but in fact are not becoming digital. They are not taking full advantage of the technical opportunities the Internet offers. The dominant document format of PDF is essentially digitized paper, which promotes cross-platform human readability but restricts machine readability such as text mining, semantic indexing²⁵ and direct integration with databases. Also, digital rights management (DRM) software, which is built on restrictive copyright licenses, can block even basic analysis of traffic by a university library of its own professors' reading patterns. Thus, advanced indexing and academic research on the literature ("treating the literature as data" as mentioned in the

Budapest definition of OA) is made impossible, and even basic statistical analysis is prohibited.²⁶

Open Access journals gain these advantages of the digital more easily than models of distribution grounded in the analog world. Open Access journals cost less for users (in general they are completely free to the readers or based on added-value service models²⁷), grant the kind of re-use rights most scientists associate with the Web culture (the right to forward, email, and print). They are in some ways more innovative²⁸ and willing to experiment with other aspects of analog publishing such as the decoupling of “validation” in peer review (“Is the research accurate?”) from the much more subjective and troublesome assessment of “probable impact” (“Is the research going to be enormously impactful in the next five years?”). Also, Open Access journals provide a faster validation of scientific results and a faster distribution of scientific results, while ensuring the same quality factor as the traditional model, since online journals that follow the Open Access distribution model remain grounded in peer-review²⁹.

A noteworthy consequence is that **Open Access journals are receiving increasing distribution and attaining impact factors that, in some cases, surpass the impact of the mainstream close access scientific journals.**

A study published today in PLoS Biology provides robust evidence that open-access articles are more immediately recognized and cited than non-OA articles. This editorial provides some additional follow up data from the most recent analysis of the same cohort in April 2006, 17 to 21 months after publication. These data suggest that the citation gap between open access and non-open access papers continues to widen. I conclude with the observation that the ‘open access advantage’ has at least three components: (1) a citation count advantage (as a metric for knowledge uptake within the scientific community), (2) an end user uptake advantage, and (3) a cross-discipline fertilization advantage.³⁰

This is more pronounced when the Immediacy Index is analyzed. In a study published by Thomson³¹, the Immediacy Index shows a bigger impact from Open Access journals: from 293 journals studied, “The mean percentile rank of OA journals by Immediacy Index is 46%. Twenty OA journals ranked in the top 10% of their categories by Immediacy Index, with four

journals ranked in the top 10% in more than one category. While 50% of the OA journals rank below the 50th percentile by Immediacy Index, it is often the case that an OA journal will rank higher in category by Immediacy Index than by Journal Impact Factor. This may suggest that OA journals' content is more rapidly accessed and cited than comparable traditional access journals.”³² It is worth noting that Thomson itself is a closed access publisher.

Open Access also resonates with the ICT revolution by empowering the individual. In a world where peer recognition is the “coin of the realm,” OA transfers power to the scientist as both a producer and consumer of knowledge. The possibility of self-archiving and the submission of the paper to peer-review leave more power in the scientist than the analog models. Another crucial aspect of the individual empowerment can be noticed on the consumer end, as more access means an increased ability to remain current: “The scholarly journal also played a vital part, offering faculty and students a means not only of staying current in their fields, but of participating through their own research in what is increasingly becoming the global circulation of knowledge.”³³

The broader recognition is enhanced by the possibility of reading an article from an OA journal from any part of the world. Besides, as the majority of OA journals adopt open copyright license systems – such as Creative Commons³⁴, [Digital Peer Publishing License](#)³⁵ (DPPL from the "Digital Peer Publishing"/DiPP initiative), and the “License To Publish” model³⁶ – the articles can be translated into different languages under the right to create derivative works³⁷, which help spreading the author's work through different languages and cultures where it might have great impact.

Another advantage that empowers the scientist is that **Open Access allows broader and faster opportunities for scientist from any country to publish** their work. Both through new journals and through online self-archiving, scientists can now make their work available to other readers anywhere in the world. With pre-print servers like the [physics arXiv](#)³⁸ and biology's [Nature Precedings](#)³⁹, after the peer review process is finished, the article goes online, saving months of delay when compared to paper journals. For scientists unable to gain access

to the non-digital social networks like those of the “conferences circuit” (a traditional place for exchanging pre-prints and submitted papers) this is an enormous breakthrough.

From a community perspective, **Open Access also empowers the society**. Access to information without bias and access to information that fits a community’s specific need are essential. **Open Access allows communities and its institutions to manage the scientific information to which** they have access, by allowing translation into local languages, aggregation of literature into “virtual journals,” integration between information and data, text mining and navigation through the Web. **Thus Open Access puts in the hands of the community the choices of urgency, priority and local relevance.**

Additionally, **Open Access naturally improves communication** through open distribution. By doing that, **OA can foster partnerships and strengthen scientific cooperation and collaborative approaches**⁴⁰ to face problems that are common to some developing countries, such as AIDS and the neglected deceases. A classic example of this process is the PLoS Neglected Tropical Diseases⁴¹, where 40% of the peer-reviewers are from developing countries.

In this sense, Open Access, and the free software technologies such as the Open Journal System⁴², can be considered appropriate technologies for developing (and developed) countries, increasing technology and knowledge transfer. This is a new way of thinking about technology transfer, not as a gift of “free stuff” without cost, but as a philosophy of knowledge distribution. It is a way of thinking that has only become possible with the ICTs revolution.

Consequently, Open Access approach to research and publishing are important policies for developing countries as well as for developed countries where the concept of Open Access (“[Berlin Declaration](#)”⁴³, “[Bethesda Declaration on Open Access Publishing](#)”⁴⁴ and the “Budapest Open Access Initiative” – the BBB definitions) and the first initiatives were launched. Those definitions, if implemented, create the core conditions for knowledge transfer North-South, South-South and South-North, urged by international treaties such as the Trade-

Related Aspects of Intellectual Property Rights WTO Agreement (TRIPS) that establishes in its established in the article 7 that:

The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the **transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge** and in a manner **conducive to social and economic welfare, and to a balance of rights and obligations.**⁴⁵

The Convention on Biologic Diversity born at the 1992 Earth Summit in Rio de Janeiro and signed by 168 countries⁴⁶, affirmed, previously to the TRIPs agreement that knowledge access and transfer are essential needs to achieve, by 2010, a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth (a new target under the Millennium Development Goals, endorsed by the World Summit on Sustainable Development and the United Nations General Assembly). This position is established, mainly, in the CBD articles 16 (1), (2), (3) and 17 (1), respectively:

16. *Access to and Transfer of technology:* (1) Each Contracting Party, recognizing that technology includes biotechnology, and that both **access to and transfer of technology among Contracting Parties are essential elements for the attainment of the objectives of this Convention**, undertakes subject to the provisions of this Article to **provide and/or facilitate access** for and transfer to other Contracting Parties of technologies that are **relevant to the conservation and sustainable use of biological diversity or make use of genetic resources and do not cause significant damage to the environment.** (2). Access to and transfer of technology referred to in paragraph 1 above **to developing countries shall be provided and/or facilitated under fair and most favorable terms, (...)**⁴⁷

17 (1). **The Contracting Parties shall facilitate the exchange of information**, from all publicly available sources, **relevant to the conservation and sustainable use of biological diversity, taking into account the special needs of developing countries.**⁴⁸

By lowering the cost of research publishing and opening doors to cooperative and comparative projects, Open Access has the potential to overcome barriers of the subscription fees that, in developing countries, block more innovative new research than in developed countries.

Capacity building is another possible consequence of the expansion of Open Access. However, it is important to keep in mind Gil's proposal of "tropicalismo". In tropicalismo, technology and knowledge are managed in an environment favorable to cooperative solutions to local problems, in a process where communities can develop their own authorship and classifications. In this sense: "ICT development initiatives driven by community-created content may allow community members themselves to identify and pursue information access indicators that serve collective community needs."⁴⁹

Thus, it is of great importance – when developing local initiatives for Open Access – to look for models worthy of adoption and models that might carry negative unintended consequences. This analysis process must mesh with locally identified visions and developmental goals, making sure to understand what is "free beer" and what is "freedom", since freedom is required to the exercise of free in speech, and this right is faced as a matter of liberty and development.⁵⁰ Realities of technology transfer are not merely a political or economic exchange, but a "profoundly cultural process"⁵¹. "This approach holds promise to sustain within communities the returns on the investment and efforts of the researcher or institution."⁵²

In this sense, **initiatives such as HINARI⁵³, AGORA and OARE are good ideas in theory, but in practice must be found insufficient** since they represent only "free beer" for the developing world. These initiatives provide for some institutions, from some developing countries, free or low cost access to content that is published under DRM control and restrictive copyright policies. No rights are granted other than the right to read the content that is chosen by the traditional publishers. They have their virtues, but they cannot be considered Open Access, since they are not truly empowering developing countries and their citizens. Real Open Access, as noted in the BBB definitions gives readers rights, not just papers without cost. This is a potential danger of the "green road" model as the rights to translate and repost

articles are fundamentally important in the developing world for capacity building, but are frequently not retained by authors.

Open Access is also not simply based in knowledge transfer from the developed to the developing world. Initiatives from developing countries add crucial contributions to the Open Access movement, creating new brands and increasing competition. These models bring dynamic character to a very concentrated market and, finally, can change perceptions about the scientific stagnation of and on the peripheries of the world. Great examples of this phenomenon are Scielo⁵⁴, from Latin America, and Indian Journal of Postgraduate Medicine⁵⁵, from India.

Above and beyond the TRIPs mandate and the bridging of knowledge gaps, Open Access policies guarantee the **accomplishment of human and social rights**. **Access to knowledge represents an universal and indivisible legitimated international interest in the Knowledge Society⁵⁶ and is a essential condition to the exercise of the human rights from the Universal Declaration of Human Rights from 1948**, specially the ones established in its articles 19, 22 and 27 that state, respectively:

“Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to **seek, receive and impart** information and ideas through any media and regardless of frontiers”;

“Everyone, as a member of society, has the right to social security and is entitled to realization, through national effort and international co-operation and in accordance with the organization and resources of each State, of the economic, social and cultural rights indispensable for **his dignity and the free development of his personality**” and

“(1) Everyone has the right **freely to participate in** the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits. (2) Everyone has the right to the **protection of the moral and material interests** resulting from any scientific, literary or artistic production of which he is the author.”

The Inter-American Court of Human Rights decisions have, since the 1980's, highlighted that the access to information and knowledge is an pre-condition to the existence of a free society, asserting that "a society that is not well informed is not completely free". The Court also asserts that the right to information presents an individual and collective dimension and in an opinion from 1985 concluded:

This language establishes that those to whom the Convention applies not only have the right and freedom to express their own thoughts but also the right and freedom to **seek, receive and impart** information and ideas of all kinds. Hence, when an individual's freedom of expression is unlawfully restricted, it is not only the right of that individual that is being violated, but also the right **of all others to "receive" information and ideas**. The right protected by Article 13 consequently has a special scope and character, which are evidenced by **the dual aspect of freedom of expression**. It requires, on the one hand, that **no one be arbitrarily limited or impeded in expressing his own thoughts**. In that sense, it is a right that belongs to each individual. **Its second aspect, on the other hand, implies a collective right to receive any information whatsoever and to have access to the thoughts expressed by others.**⁵⁷

Consequently, knowledge is essential to the exercises of both sets of human rights: social-economic-cultural and civil-political. Since these sets are indivisible, the full exercise of one group is condition for the full exercise of the other, and vice versa.

Open Access is a modern phenomenon that fulfills these human rights by addressing the access to knowledge as a pathway to development. And development too is an international human right that demands the construction of the Information Society based on ethic and solidarity. For Mohammed Bedjaoui: "In reality, the international dimension of the right to development is nothing more than the right to an equal sharing of the social and economic growth"⁵⁸. In his book *Development as Freedom*, Amartya Sen states that "Development can be seen here as a process of expanding the real freedoms that people enjoy"⁵⁹.

However, even with all benefits derived from Open Access (in its forms of journals and institutional repositories); **there is still a great lack of awareness of the Open Access phenomenon by the international scientific and librarian communities.** This leads to a lack of trust from some scholars and librarians to start a process of implementing and fostering Open Access in the institution and communities they are part of. Fear and low levels of cultural change capacity are some factors that are in the basis of this immobility. **Authors fear their work and ideas will be stolen while institutions fear that they will not be accessing the most illustrious information.**

Both of these problems can be faced with clear use of the facts and a sense of optimism. This fear is easiest to combat, by showing data regarding the success of Open Access through numbers and Impact factors. Institutional cultural change takes more time, but there is real progress at Harvard, MIT, and in other major universities of United States, and in other countries such as European Union countries, Brazil and South Africa. Regarding the “theft of ideas”, this is a false fear. **The copyright rules do not lose their applicability in an Open Access environment.** The uses of the articles and knowledge disseminated under the Open Access flag are based on a copyright license, just as articles self-archived are still subject to the terms of the copyright agreements between traditional journals and the authors.

Based on what the copyright laws allow, the owner of the copyrighted work, when her/his paper is published by an Open Access journal, allows certain kinds of uses of her/his work, using the law to mediate this permission. Consequently, if somebody copies and does not cite the source of the information (the attribution part of the license), this action can still constitute a copyright violation under the law and by the Open Access Movement.

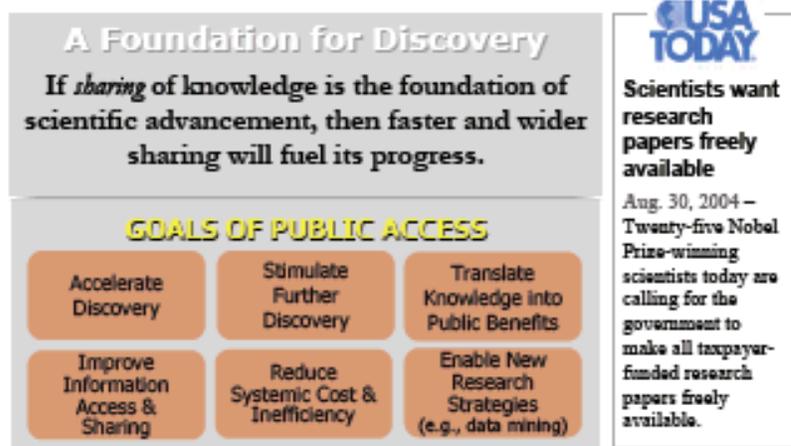
Thus, one of the most important things when developing an Open Access journal⁶⁰ is to establish the user’s rights through the application of the BBB definitions and the employment of one set of licensing such as: Creative Commons, DPPL or “License To Publish”, referred previously. Just by taking this step, the journal will be a truly Open Access journal and the necessary juridical stability and security will prevail.

Another great challenge for the Open Access movement expansion is the institutional-cultural barrier. In 2003, SPARC launched a [brochure](#) that can be used by scholars and librarians to start this change. **However, public policies and private-funders policies are essential to achieve the goal of Open Access.**

This imperative was emphasized in August, 26, 2004, when twenty-five Nobel Prize-winning scientists called for the government to make all taxpayer-funded research papers freely available in the United States. "Science is the measure of the human race's progress," scientists say in the [letter](#)⁶¹ sent to Congress and the National Institutes of Health (NIH)⁶². The legislation has been opposed by the publishing industry including the formation of a lobbying group. In the same spirit, in the United States, the Code of Federal Regulations established, in 2004 the following rule: "The Federal awarding agency(ies) reserve a royalty-free, nonexclusive and irrevocable right to reproduce, publish, or otherwise use the work for Federal purposes, and to authorize others to do so."⁶³

The National Institutes of Health (NIH), after urging by the U.S. House Appropriations Committee to require public access to NIH-funded research through deposit in the NIH's PubMed Central, announced a policy based on voluntary archiving after 12 months of the official publication in any scientific journal: "NIH-funded investigators are **requested** to submit an electronic version of the author's final manuscript upon acceptance for publication" and "Posting for public accessibility through PMC is **requested and strongly encouraged** as soon as possible (and within **twelve months** of the publisher's official date of final publication)". It is important to note that this request means the policy is completely voluntary and subject to the restrictions of publishers.

Figure 2⁶⁴



The objectives of the NIH policy are three: **Archive, by creating** a stable archive of peer-reviewed research publications resulting from NIH-funded research to ensure the permanent preservation; **advance science, by securing** a searchable compendium of these publications that NIH can use to manage better its research portfolio and that NIH awardees can mine and **Access, by making** peer-reviewed results of NIH funded research more readily accessible to the public, health care providers, educators, and Scientists Policy.

However, as previously noted, institutional change takes time and sometimes direct government mandate, not a policy of requesting, is needed to foster meaningful change. The voluntary approach used by the NIH had as its result a very low rate of voluntary deposit (~4%), leading to protests from the scientific community and a report from the NIH Public Access Working Group recommending a *mandatory* policy, with maximum *6-month* embargo. In 2006, the Board of Regents of NIH's National Library of Medicine endorsed the working group recommendation and today the NIH and, as of this writing, the U.S. Congress is contemplating whether and how the policy should be adjusted⁶⁵.

Though most of the arguments so far are around the concerns of the developed world like taxpayer access⁶⁶, one relatively undiscussed argument for OA can be found in TRIPS in the context of the developing world. The enactment of laws and public policies to embrace the

expansion of the Open Access movement is supported by the article 8 of the TRIPs, “Principles”:

1. Members may, in formulating or amending their laws and regulations, adopt **measures necessary to protect** public health and nutrition, and to promote the public interest in sectors of vital importance to their socio-economic and technological development, provided that such measures are consistent with the provisions of this Agreement.

2. Appropriate measures, provided that they are consistent with the provisions of this Agreement, **may be needed to prevent the abuse of intellectual property rights by right holders** or the **resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology**.⁶⁷

Consequently, the development of national law to enact the possibility of compulsory license under the exception and limitation and fair use of copyrighted works, as allowed by article 13 and 44 of the TRIPs and the Bern Convention⁶⁸, in addition with policies that mandate the [public access](#) – through Open Access Journals – of results from public funded research are **legitimate measures to protect public health and nutrition, and to promote the public interest in sectors of vital importance to socio-economic and technological development**.

Some of these themes are already being tested in practice in the developing world. Brazil, for example, has been acting as a leader in the discussion of the Open Access movement. In 2005, Brazil opened its doors to an important international symposium – the International Seminar on Open Access, a parallel event to the 9^o Mundial Congress on Information in Health and Libraries and the 7^o Regional Congress on Information in Health Science – where the Salvador Declaration was born⁶⁹.

Also, despite the lack of specific legislation and, actually, in the presence of a new innovation law based on the U.S.A. Bayh-Dole Act – which can slow down publications, prioritizing confidentiality in order to prosecute patents by public universities – and a increasing restrictive copyright legislation, government bodies and foundations, such as the

Brazilian Institute for Information and Science (Ibict) and the State of São Paulo Science Foundation (FAPESP) joined with BIREME, are leading initiatives that are already consider global success models, such as the more than 10 years-old Scientific Electronic Library Online - Scielo⁷⁰ (Gold Road) and OASIS (Green Road).

Ibict, under the Open Access and Scholarly Information Brazilian System ([OASIS](#)⁷¹) hosts the Digital Library of Thesis and Dissertations (BDTD), a national digital library for electronic theses and dissertations from the Brazilian federal and state universities. The BDTD is already integrated in the international Networked Digital Library of Thesis and Dissertation (NDLTD). The project has been a collaborative effort among Ibict, universities and other research centers in Brazil, with an architecture based on the Open Archives Initiative (OAI), where universities and research centers act as content providers and Ibict as a service provider. A Brazilian metadata standard for electronic theses and dissertations was developed for the BDTD and a toolkit including open source package is being also distributed.⁷²

Moreover, Open Access is not merely a matter of national interest. Funders of research in health and medicine such as the major foundations are, gradually, embracing funding policies that mandate Open Access. In its position statement in support of open and unrestricted access to published research, the Wellcome Trust, one of the biggest private foundations in the area of health, established:

The mission of the Wellcome Trust is to foster and promote research with the aim of improving human and animal health. The main output of this research is new ideas and knowledge, which the Trust expects its researchers to publish in quality, peer-reviewed journals. The Wellcome Trust has a fundamental interest in ensuring that the availability and accessibility of this material is not adversely affected by the copyright, marketing and distribution strategies used by publishers (whether commercial, not-for-profit or academic). With recent advances in internet publishing, the Wellcome Trust seeks to encourage initiatives that broaden the range of opportunities for quality research to be widely disseminated and freely accessed. The Wellcome Trust therefore supports unrestricted access to the published output of research as a fundamental part of its charitable mission and a public benefit to be encouraged wherever possible.⁷³

An important step to fulfill the call from the civil society that has declared: “Clear directions set by major funders will have profound effects on author behavior and, subsequently, publishing practices.”⁷⁴

However, Open Access has the potential to create negative unintended consequences that are frequently overlooked by the Open Access movement, such as the: exposure of traditional knowledge without fulfilling the steps stated by the Convention on Biologic Diversity (CBD), a broader wealth divide if problems such as multi-linguistic needs are not faced, the imperatives of technological determinism, and the lack of clear adoption of Intellectual Property policies to guarantee the sustainability of the OA principles, among others.

The “traditional knowledge” movement’s rationale is to protect from unfair exploitation⁷⁵ certain forms of knowledge that in general, since its collective nature, are not protected under the Intellectual Property laws. This movement emphasizes the need to respect the rights and claims of disadvantaged communities, seeking recognition for communal and culturally situated notions of heritage, property, and knowledge⁷⁶. Internationally, this movement has its roots in the article 8(j) of the CBD that institutes:

Article 8. In-situ Conservation: Each Contracting Party shall, as far as possible and as appropriate: (...) (j) Subject to its national legislation, respect, **preserve and maintain knowledge**, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their **wider application with the approval and involvement** of the holders of such knowledge, innovations and practices and encourage the **equitable sharing of the benefits arising from** the utilization of such knowledge, innovations and practices;⁷⁷

Thus, the main concern of the advocates from the traditional and indigenous communities is the recognition of years of knowledge expropriation without the necessary previous concern and the post equitable sharing of benefits. At the 2nd Meeting of the Intellectual Property Northern Network (Rede Norte), named “Biodiversity and Traditional Knowledge - Rethinking

the roads to research with Indigenous and Traditional communities: New directives to the development of scientific practices”⁷⁸, a group of civil society organizations from the Amazon region stated recommendations about ethics on research based on the CBD-Access and Benefit Sharing (articles 8(j) and 15) mandates and the WHO mandates regarding research on humans and animals. Numerous communities leaders called the audience’s attention for the fact that, even with promises made and, in some cases, contract with local authorities executed, the researcher, after finishing the field research, never came back to share with the community the outcomes achieved. In most of the cases declared, the main community’s interest was access to the knowledge produced derived from the community knowledge, through local training and education. Simple “open publishing” of this research could propagate information that is culturally protected in indigenous societies, or that did not have previous informed consent, potentially violating the compact between researcher and community.

Another risk faced by the Open Access movement is the establishment of a broader wealth divide if problems such as multi-linguistic needs and other such as the digital divide are not faced properly. Consequently, the adoption of Intellectual Property policies to guarantee the sustainability of the Open Access objectives and that clearly authorizes the production of derivative works, such as translations, to attend the demand of non-English speakers and users with disabilities, such as the production of articles in Braille, among others, are crucial. Moreover, creative distribution and cooperative models to access regions with no Internet access still needed⁷⁹. For example, it is illegal, without copyright permission, to fill hard drives with content or print and copy content for distribution in areas underserved by ICTs.

Thus, we have to ensure that Open Access is completely implemented, that is sensitive to local issues of Traditional Knowledge and it is not mistaken for the total solution of capacity building. Only then it will achieve its full potential to help the developing world and be considered a distribution model that is appropriate to people’s long-term needs.

OA represents a very important step to ensure the international knowledge access and transfer. Considering that, a new report by the National Research Council – composed of

former national security leaders and senior university researchers and administrators – says that to “strengthen the essential role that science and technology play in maintaining national and economic security, the United States should ensure the open exchange of unclassified research despite the small risk that it could be misused for harm by terrorists or rogue nations”. The report supports the idea that the global interchange of knowledge and people is crucial for development, affirming that, since science and technology are truly global pursuits, “U.S. universities and research institutions must continue to welcome foreign-born science and engineering students.”

Universal access to knowledge – with full freedoms to localize that knowledge – is not just a matter of development, science, or security. It is a matter of the right to development. Open Access fulfills this right in support of human enrichment and health, and is one of the pre-eminent methods to achieve the human rights goals and bridge the divides, digital and physical, between the developing and developed worlds.

FOOTNOTES:

Note: all the resources from Internet were retrieved between August and October 2007.

¹ Yochai Benkler, [The Wealth of Networks: how social production transforms markets and freedom](#) 1 (Yale University Press) (2006).

² [Commission on Physical Sciences, Mathematics, and Applications \(CPSMA\) and Engineering and Physical Sciences \(DEPS\) Bits of Power: Issues in Global Access to Scientific Data](#) (National Academies Press) (1997) at http://www.nap.edu/catalog.php?record_id=5504.

³ See Benkler, *supra* note 1, at 1.

⁴ Manuel Castells, [A Era da Informação: Economia, Sociedade e Cultura - A Sociedade em Rede](#). Vol.1. 109 (Editora Paz e Terra) (2001) (translated from the portuguese version by Carolina A.A. Rossini).

⁵ “Rapid improvements have led to ever greater computational speed, communication bandwidth, and storage capacity at costs within reach of even small—scale users—a trend that appears likely to continue well into the future. Moreover, technical advances in satellites, sensors, robotics, and fiber-optic and wireless telecommunications are extending the range of technologies affecting the acquisition, refinement, analysis, transmission, and sharing of

scientific data.” See CPSMA *supra* note 2, at 24. Bits of Power provides a comprehensive analysis, at its page 28, of the changes brought by the ICTs developments. For this purpose, refers to TABLE 2.2 “Summary of Technical Trends Affecting Exchange of Scientific Data and Information” at http://www.nap.edu/openbook.php?record_id=5504&page=28.

⁶ For the purposes of this paper, the concept of knowledge adopted is the one presented in The Wealth of Networks, *Supra* note 1, at 313: “set of cultural practices and capacities necessary for processing the information into either new statements in the information exchange, or more important in our context, for practical use of the information in appropriate ways to produce more desirable actions or outcomes from action.”

⁷ World Summit on Information Society (WSIS). Declaration of Principles: Building the Information Society: a global challenge in the new Millennium (hereinafter: WSIS Declaration of Principles) (2005) at <http://www.itu.int/wsis/docs/geneva/official/dop.html>.

⁸ Robin Cowan Economic Overview of Open Access and the Public Domain in Digital Scientific and Technical Information in Open Access and the Public Domain in Digital Data and Information for Science: Proceedings of an International Symposium. (The National Academies Press) (2004) at http://books.nap.edu/catalog.php?record_id=11030.

⁹ The 8th principle of the WSIS Declaration of Principles: “**We recognize** that education, knowledge, information and communication are at the core of human progress, endeavour and well-being. Further, Information and Communication Technologies (ICTs) have an immense impact on virtually all aspects of our lives. The rapid progress of these technologies opens completely new opportunities to attain higher levels of development. The capacity of these technologies to reduce many traditional obstacles, especially those of time and distance, for the first time in history makes it possible to use the potential of these technologies for the benefit of millions of people in all corners of the world.” See WSIS Declaration of Principles *supra* note 7.

¹⁰ Benkler, in Chapter 3-Peer Production and Sharing of The Wealth of Networks, presents other case analyses of collaboration process, identified as “peer production”, an alternative for centralized knowledge production and distribution. *Supra* note 1.

¹¹ “The need for developing countries to become a greater part of a new world information order has inspired a number of global initiatives by the private sector and aid agencies to build developing countries’ technical infrastructure. As a result, computers and connectivity are appearing.” John Willinsky, The Access Principle: The Case for Open Access to Research and Scholarship 96 (MIT Press) (2006) at <https://mitpress.mit.edu/catalog/item/ebook.asp?type=2&tid=10611>.

¹² Ramesh Srinivasan Where Information Society and Community Voice Intersect, in The Information Society – An International Journal, 22:5, 355 – 365 (2006) <http://dx.doi.org/10.1080/01972240600904324>.

¹³ “Economic development in the industrially advanced societies of the West invariably has been accompanied by a structural shift of labor from the primary and secondary production sectors to the tertiary service sector. A systematic analysis of the service sector shows that the commodity on which this sector acts is information. The growing importance of information for control and management in a developed society is the primary reason for the structural shift of labor to the service sector. A professionalized service sector constitutes the critical backbone of a developing society, and information technology is the underpinning of this sector. The development and application of information technology for use by professionals and paraprofessionals are necessary to extend the scope and improve the standards of functionally available services in a society. Information technology in this sense is an appropriate technology for socioeconomic development in the countries of the Third World.” R. Narasimhan. The Socioeconomic Significance of Information Technology to Developing Countries-Abstract. In The Information Society- An International Journal. 2 :1. An example of an appropriate technology is the “[One Lap Top per Child](#)” (OLPC) initiative.

¹⁴ http://www.nap.edu/openbook.php?record_id=5504&page=17.

¹⁵ The Budapest Open Access Initiative at <http://www.soros.org/openaccess/read.shtml>.

¹⁶ *Id.* BOAI.

¹⁷ The Directory of Open Access Journals ([DOAJ](#)) is a list of journals conforming to OA definitions. The aim of the Directory of Open Access Journals is to increase the visibility and ease of use of open access scientific and scholarly journals thereby promoting their increased usage and impact. The Directory aims to be comprehensive and cover all open access scientific and scholarly journals that use a quality control system to guarantee the content. At <http://www.doaj.org/>.

¹⁸ “An Institutional Repository is an electronic storage system designed to maintain items of particular value to an institution, such as the journal articles written by a university’s faculty members. (...) It is just that no library can afford to subscribe to all the journals. (...) Once universities realize that the Institutional Repositories facilitate access to the work of their own staff, Institutional Repositories are likely to become very popular with administrators. (...) The Institutional Repository also provides an easy way for me to share my work with potential readers, without wondering whether their library has a subscription.” Heather Morrison, The Dramatic Growth of Open Access: Implications and opportunities for Resource in Journal of Interlibrary Loan, Document Delivery & Electronic Reserve 16:3 pp 10 and 11 (2006) at <http://hdl.handle.net/1892/510>.

¹⁹ For more information about self-archiving I suggest a look at the *Self-Archiving FAQ* for the Budapest Open Access Initiative (BOAI) at <http://www.eprints.org/openaccess/self-faq/>.

²⁰ “Institutional repositories — digital collections that capture and preserve the intellectual output of university communities— respond to two strategic issues facing academic institutions: 1) they provide a central component in reforming scholarly communication by stimulating innovation in a disaggregated publishing structure; and 2) they serve as tangible indicators of an institution’s quality, thus increasing its visibility, prestige, and public value. This paper examines institutional repositories from these complementary perspectives, describing their potential role and exploring their impact on major stakeholders in the scholarly communication process.” Raym Crow, [The Case for Institutional Repositories: A SPARC Position Paper](http://www.arl.org/sparc/bm~doc/ir_final_release_102.pdf). SPARC. (2002) at http://www.arl.org/sparc/bm~doc/ir_final_release_102.pdf.

²¹ “It is widely believed by academic librarians and others that this system is in a state of crisis due primarily to the increasing cost of scholarly journals far in excess of inflation, the proliferation of new journals that are ever more specialized, the failure of library budgets to keep up with these cost and journal proliferation factors, and the resultant increasing restriction of access to journal literature as libraries cancel existing journals and fail to add new specialized ones.” Charles W. Bailey, Jr., [Open Access Bibliography: Liberating Scholarly Literature with E-Prints and Open Access Journals](http://www.escholarlypub.com/oab/oab.pdf). Association of Research Libraries (2005) at <http://www.escholarlypub.com/oab/oab.pdf>. This Bibliography provides over 1,300 selected English-language sources of all types and media that are useful in understanding the open access movement.

²² See Benkler, *supra* note 1, at 323.

²³ Associate of Research Libraries (ARL), [Information Access Alliance Takes Action on Proposed Wiley Acquisition of Blackwell](http://www.arl.org/news/pr/iaawileyblackwellnov06.shtml) at <http://www.arl.org/news/pr/iaawileyblackwellnov06.shtml>.

²⁴ ARL, [Statistics 2003-2004](http://www.arl.org/sc/marketplace/serials.shtml) at <http://www.arl.org/sc/marketplace/serials.shtml>.

²⁵ The Science Commons Neurocommons project is a creative and innovative initiative to address exactly this question of using the right ICTs tools to manage knowledge in a more efficient manner. The project is building on Open Access scientific knowledge to build a [Semantic Web](http://www.sciencecommons.org/projects/data/) for neurological research. Science Commons, [The Neurocommons Project](http://www.sciencecommons.org/projects/data/) (2007) at <http://www.sciencecommons.org/projects/data/>.

²⁶ This can be seen in the contract signed between University of California System and Reed Elsevier (that controls 20% of the core scientific literature: http://www.lib.berkeley.edu/Collections/elsevier_case_study.html), specifically in its “General Terms and Conditions”, clause GTC1 that states: “Subscriber shall not use spider or web-crawling or other software programs, routines, robots or other mechanized devices to continuously and automatically search and index any content accessed online under this agreement”. The entire contract can be read at <http://orpheus-1.ucsd.edu/acq/license/cdlelsevier2004.pdf>.

²⁷ For examples of new business models related to e-publishing see ARL site <http://www.arl.org/sc/models/index.shtml> and the Open Business Guide, 8.2. Open Business Models, at http://wiki.icommons.org/index.php/The_OpenBusiness_Guide.

²⁸ A great example of an Open Access journal that is guided by innovative application of ICTs technologies is PLoS One at <http://www.plosone.org/>. The press release for the 2006 launch of PLoS One can be read at http://www.eurekalert.org/pub_releases/2006-06/plos-plo060706.php and an interesting blog enter by [Barry Graubart](#) related to PLoS One is: PLoS One “is a peer review platform that uses both traditional and web-based comments. Each article is peer-reviewed with oversight by an academic board, much like other scientific journals. After publication, however, articles published on PLoS One are then opened up for reader annotation, discussion and rating, creating a dialog between author and reader. As a Public Library of Science offering, the product is completely open-source and published under the [Creative Commons](#) License. Rather than charging users for the content, PLoS charges a nominal (\$1,250) fee to authors [the ones that can pay, since scientists without sufficient funds are not obliged to pay this fee] to have their articles reviewed. For various reasons, this blog focuses largely on business and financial content. However, there is quite a bit more innovation going on in the STM market today. Both Nature and Public Library of Science have previously been named to the ‘[50 Content Companies that Matter](#)’ list. I have no doubt that these two organizations will continue to push the envelope in 2007.” Barry Graubart Blog (2007) at http://www.contentmatters.info/content_matters/2006/12/public_library_.html

²⁹ “[T]he article submitted by the author is then sent to one or more colleagues (anonymous) who act as referees assessing the value of the article, submitting corrections and amendments before publication.” One example cited by this article is the *Journal of High Energy Physics (JHEP)*: “*JHEP* was launched by SISSA in 1997. Nowadays it is the most important and inexpensive magazine of the sector. It is a completely computerized electronic magazine (no printed copy is published). Articles are submitted via the direct uploading of files to the magazine site. Each article submitted to *JHEP* is managed by a robot which, through a keyword-based system, assigns it to an editor who is invariably a scientist of worldwide renown. Editors then select one or more referees and their decision on whether to publish the article or not will based on the referees’ evaluation report. The refereeing process is the only stage coinciding with the standard procedure in traditional magazines. All the passages, from author to editor, from editor to referee and back to editor are computerized, as are the exchanges between the members of the editorial staff and the on-line publication of the accepted article. Of course, an electronic magazine is also economically competitive: *JHEP* is 10 to 15 times less expensive than its traditional competitors. (...)Third world countries have free access to *JHEP*, while access for richer countries requires a moderate and affordable subscription fee which is accepted by most scientific institutions. This limitation to the access to *JHEP* is more symbolic than real: all articles published on *JHEP* are freely available in the preprint archives, and in any case, a few years after publication all *JHEP* issues become available for free.” Lorianò Bonora, The Evolution of Scientific Publishing and the JHEP Model, JCOM 2:4, 5 (2003) at <http://jcom.sissa.it/archive/02/04/F020403/>.

³⁰ Gunther Eysenbach, The Open Access Advantage. J. Med. Internet Res. 8(2):e8. (2006) at <http://www.jmir.org/2006/2/e8>.

³¹ “Immediacy Index and JCR Impact Factor are considered to be critical journal performance metrics, as they reflect the citation activity for journal articles one to three years after their initial publication. An Immediacy Index considers only one year of data and can be calculated after a journal has been indexed and cited for one full year. Because it considers citations to articles in the same year as their publication, the Immediacy Index is an indication of the speed with which items published in the journal are incorporated into other literature’s references. A high Immediacy Index suggests that the journal’s content is quickly noticed, highly valued and topical within its field” Marie E. McVeigh, Open access journals in the ISI citation databases: a citation study 4 Thomson Scientific (2004) at <http://www.thomsonscientific.com/media/presentrep/essayspdf/openaccesscitations2.pdf>.

³² See McVeigh, *id.*, at 6.

³³ See Eysenbach, *supra* note 30.

³⁴ “*PLoS Biology*, *BMC Biology*, and *Nucleic Acids Research* conform to open access, as defined by the Bethesda Statement. *PLoS Biology* and *BMC Biology* apply the Creative Commons ‘Attribution’ (by) license to their articles, whereas *Nucleic Acids Research* applies the Creative Commons ‘Attribution Non-commercial’ (by-nc) license. *Molecular Systems Biology* also applies a Creative Commons license to their articles, but this journal provides free access rather than open access, because they do not allow any derivative works to be made without permission. The particular license they use is the Creative Commons ‘Attribution Non-commercial No derivatives’ (by-nc-nd) license. The journal *Proceedings of the National Academy of Sciences (PNAS)* does not use a Creative Commons license, but they do have a free access option. Their articles can be used for a wide range of purposes without permission, but the creation of derivative works is still restricted so this option is also not open access.” MacCallum CJ (2007) When Is Open Access Not Open Access? *PLoS Biol* 5(10): e285 at <http://dx.doi.org/10.1371/journal.pbio.0050285>. Law Journals that have adopted the [the Creative Commons Attribution-NonCommercial License](#), or have policies consistent with the Open Access Law Journals Principle from Creative Commons can be found at <http://sciencecommons.org/projects/publishing/oalawjournals/>

³⁵ http://www.dipp.nrw.de/lizenzen/dppl/dppl/DPPL_v2_en_06-2004.html

³⁶ Surf Foundation at <http://copyrighttoolbox.surf.nl/copyrighttoolbox/authors/licence/>. “Other approaches include replacing the copyright alienation systems with non-exclusive grants of a ‘license to publish’ wherein the author retains ownership of the copyright and thus the rights to archive the article.” Science Commons, Science Commons Background: Policies for Open Access to Scholarly Literature at <http://sciencecommons.org/projects/publishing/background-briefing/>.

³⁷ It is important to notice that Open Access is different from free access, in the same sense that “free as in speech, not as in beer”, paraphrasing an expression used in the free-software movement. Catriona J. MacCallum explores this aspect in her editorial and analyzes some access/copyright policies adopted by journals that publish their content on The Internet. See MacCallum *supra* note 34. It is worth noticing that not all the journals that call themselves open access are truly open access under the Budapest definition I adopt in this article.

³⁸ <http://arxiv.org/>

³⁹ <http://precedings.nature.com/>

⁴⁰ In her blog, [Eve Gray](#) summarizes her recent [Policy paper](#) for the OSI International Policy Fellowship, detailing her [recommendations](#) for improving access to research in Africa. Here she argues that Open Access and collaborative approaches could bring substantially increased impact for African research, with marked cost-benefit advantages.

⁴¹ <http://www.plos.org/cms/node/188>

⁴² http://en.wikipedia.org/wiki/Open_Journal_Systems

⁴³ <http://oa.mpg.de/openaccess-berlin/berlindeclaration.html>

⁴⁴ <http://www.earlham.edu/~peters/fos/bethesda.htm>

⁴⁵ http://www.wto.org/english/docs_e/legal_e/27-trips_03_e.htm

⁴⁶ Parties of the CBD at <http://www.cbd.int/convention/parties/list.shtml>

⁴⁷ Article 16 of the CBD at <http://www.cbd.int/convention/articles.shtml?a=cbd-16>

⁴⁸ Article 17 of the CBD at <http://www.cbd.int/convention/articles.shtml?a=cbd-17>

⁴⁹ See Srinivasan, *supra* note 12, at 361.

⁵⁰ “Free software is a matter of liberty, not price. To understand the concept, you should think of free as in free speech, not as in free beer. Free software is a matter of the users' freedom to run, copy, distribute, study, change and improve the software. (...) When talking about free software, it is best to avoid using terms like give away or for free, because those terms imply that the issue is about price, not freedom.” GNU Foundation at <http://www.gnu.org/philosophy/free-sw.html>. Also, a worthy interview with Stallman (founder of the Free-Software movement) [Stallman on free beer](#) (2006) at <http://freebeer.org/blog/archives/20>.

⁵¹ See Srinivasan, *supra* note 12, at 358.

⁵² See Srinivasan, *supra* note 12, at 357.

⁵³ “HINARI was created to bridge the “digital divide” in health, ensuring that relevant information—and the technologies to deliver it—are widely available and effectively used by health personnel including professionals, researchers and scientists, and policy makers. Launched by the Secretary General of the United Nations in September 2000 and led by the World Health Organization, HINARI has brought together public and private partners under the principle of ensuring equitable access to health information. HINARI provides access to more than 2,000 scientific publications on public health to institutes within 113 eligible countries.” Sarah Durrant, Overview of Initiatives in the Developing World in Open Access and the Public Domain in Digital Data and Information for Science: Proceedings of an International Symposium (2004) at www.nap.edu/html/openaccess/122-126.pdf. For more information about HINARI refer to John Willinsky, The Access Principle: The Case for Open Access to Research and Scholarship pp 101 and 102 (MIT Press) (2006) at <https://mitpress.mit.edu/catalog/item/ebook.asp?type=2&tid=10611>.

⁵⁴ The case of SciELO: “SciELO in Latin America One of the pioneers of Open Access journal publishing in developing countries and a model of the effectiveness of regional collaboration in Open Access research dissemination is the Scientific Electronic Library Online (SciELO) project from Brazil. SciELO hosts 125 journals dealing with health and other sciences published in Brazil and other Latin American countries. SciELO is a collaboration between the Foundation for the Support of Science of São Paulo and the Latin America and Caribbean Center on Health Sciences Information, BIREME, and has significant government funding and support. SciELO operates as a network of national and thematic collections of open access journals, which are managed so as to be inter-operable, using Open Archives Initiative protocols. Around 55 000 articles with Latin American and Caribbean affiliation were online by 2006 (Packer 2006). The combination of regional collaboration and Open Access has dramatically improved the global visibility, accessibility, and impact of science from Brazil and other regions of Latin America. Article downloads have increased from 1000 in 1998 to 6 million in 2006. SciELO articles appear in Google Scholar statistics as having the third highest hits globally, and citation levels are increasing (Packer 2006). The economics of SciELO are interesting. Figures from 2005 show that, with \$1 million of government support, there were 150 journals online, at about \$650 per journal. With close on 10 000 new articles online, the cost per article was around \$100. The total of 60 000 articles available indicates a longer-term investment of around \$16 per article per year. There have been 27 million downloads, representing 3.7 cents per download. (Packer 2006). The lesson would appear to be that regional cooperation in the delivery of online Open Access research publishing, supported by government subsidy, is a worthwhile investment.” Eve Gray, Achieving research impact for development: A Critique of Research Dissemination Policy in South Africa, with Recommendations for Policy Reform pp. 44 and 45 (Open Society Institute) at http://www.policy.hu/gray/IPF_Policy_paper_final.pdf.

⁵⁵ “A striking case study, often cited as an example of the advantages of Open Access to developing countries, is the Indian Journal of Postgraduate Medicine, published by Medknow Publishers, which moved from being a locally-produced print journal in India to an Open Access journal distributed by Bioline International. It now gets 1 million hits a year and the total number of submissions increased from 190 in 2000 to over 800 in 2006. The number of submissions from authors outside India rose from less than 10 percent in 2001 to 38 percent (166) in 2003 and 30 percent (189) in 2004. It seems that the journal is now being seen as an international journal capable of reaching a global readership and is attracting a different – and wider – kind of authorship (Kirsop & Chan 2005: 251). Dr DK Sahu, the Director of Medknow Publishers, speaking at the Bangalore Workshop on Electronic Publishing and Open Access in 2006, reported a similar – if not so dramatic – increase across the range of Medknow journals when they were moved to open access, with a common pattern of improvements in the international profile of authors, higher hit rates – indicating wider readership – and increased impact factors (Sahu 2006). In common with other developing world Open Access journal publishers, Medknow has found that maintaining print subscriptions alongside open access electronic publication is a way of generating revenue and ensuring the sustainability of their journals.” See Gray, *id* at. 42.

⁵⁶ The concept of Knowledge Society is adopted by UNESCO as a substitute for “information Society” since: “in UNESCO’s view the concept of “knowledge societies” is preferable to that of “the information society” because it better captures the complexity and dynamism of the changes taking place. The knowledge in question is important not only for economic growth but also for empowering and developing all parts of society. Thus, the role of new ICTs extends to human development more generally and therefore to such matters as intellectual cooperation, lifelong learning, and basic human values and rights. Second, most developing countries have thus far been unable to take full advantage of the advances offered by new ICTs in terms of access to scientific and technological information and learning opportunities, at least relative to the situation in the industrialized countries—the “digital divide.” Matsuura Koïchiro, UNESCO’s Approach to Open-Access and Public-Domain Information in Open Access and the Public Domain in Digital Data and Information for Science: Proceedings of an International Symposium 7 (National Academic Press) (2004) at <http://books.nap.edu/html/openaccess/>.

⁵⁷ Inter-American Court of Human Rights, Opinión Consultiva OC-5/85 (1985) at <http://www.corteidh.or.cr/opiniones.cfm>

⁵⁸ Mohammed Bedjaoui, The Right to Development in International Law: Achievements and Prospects 1182 (M. Bedjaoui (ed.): 1991). To Joseph E. Stiglitz: “Development means social transformation, base on better conditions in the life of the poorer, securing to all the opportunity to success and access to health and education”. Globalization and its Discontents 252 (2003).

⁵⁹ Amartya Sen, Development as Freedom, 4 (1999) at <http://books.google.com/books?id=LFk3pHpFiG4C&printsec=frontcover&dq=development+as+freedom&psp=1>.

⁶⁰ For more regarding the development of Open Access journals, refer to: Open Society Institute, Guide to Business Planning for Converting a Subscription based Journal to Open Access at www.soros.org/openaccess/oajguides/html/business_converting.htm and Guide to Business Planning for Launching a New Open Access Journal www.soros.org/openaccess/oajguides/html/business_planning.htm.

⁶¹ The letter can be read at <http://www.acessoaberto.org/documentos.htm#cart>.

⁶² Dan Vergano, Scientists want research papers freely available in USA TODAY, (08/30/2004) at http://www.usatoday.com/news/science/2004-08-29-free-research_x.htm.

⁶³ 2 CFR 215.36, at <http://www.gpoaccess.gov/cfr/index.html>.

⁶⁴ Rick Johnson, Public Access to Publicly Funded Research in World Bank QuickStart Program (SPARC: 2006) at http://www.arl.org/sparc/bm%7Edoc/johnson_publicaccess_06apr.pdf.

⁶⁵ The current results of this debate are two, in the United states: (1) the launched of the American Center for Cures Act of 2005 (S.2104) Sec. 499H-1, which demands Public Access Requirement For Research, requiring the deposit within 6 months. This act is applied to investigators funded by NIH, Centers for Disease Control and Prevention, Agency for Healthcare Research and Quality and (2) the US Government-wide public access bill, which is still under development.

⁶⁶ In addition, **an increasing movement from taxpayers' organizations is demanding access** to public financed research. In a Sector Review from 2004, the Credit Suisse First Boston concluded: “[W]e would expect governments (and taxpayers) to examine the fact that they are essentially funding the same purchase three times: governments and taxpayers fund most academic research, pay the salaries of the academics who undertake the peer review process and fund the libraries that buy the output, without receiving a penny in exchange from the publishers for producing and reviewing the content (....) We do not see this as sustainable in the long term, given pressure on university and government budgets.” Credit Suisse First Boston (2004) Sector Review: Scientific, Technical and Medical Publishing. Boston. USA. The taxpayer demand to have free online access to full-text, peer-reviewed journal articles arising from taxpayer-funded research is called, in the United States, “public access” and is guided by some principles such as: (a) taxpayers are entitled to open access on the Internet to the peer-reviewed scientific articles on research funded by the Government, (b) widespread access to the information contained in these articles is an essential, inseparable component of our nation’s investment in science, (c) This and other scientific information should be shared in cost effective ways that take advantage of the Internet, stimulate further discovery and innovation, and advance the translation of this knowledge into public benefits, (d) Enhanced access to and expanded sharing of information will lead to usage by millions of scientists,

professionals, and individuals, and will deliver an accelerated return on the taxpayers' investment.

⁶⁶ More about public access can be found at the Policy on Enhancing Public Access to Archived Publications Resulting from NIH-Funded Research at <http://publicaccess.nih.gov/> and at the Alliance for Taxpayer Access at <http://www.taxpayeraccess.org/frpaa/>.

⁶⁷ WTO, TRIPS agreement at http://www.wto.org/english/tratop_e/trips_e/t_agm2_e.htm.

⁶⁸ “In the area of copyrights, the nature of rights under the Part II, Section One of the TRIPS include a number of other special provisions for copyright and related rights, including for example, mandatory exceptions for quotations, specific limitations on the use of compulsory licenses for some instances, and the extensive and complex [and often criticized] provisions of the Berne Appendix, a part of the Berne system that is only available to developing countries.” James Love Compulsory licensing of copyright under Article 44.2 of the TRIPS, in light of eBay in KEI Research Notes (2007) at http://www.keionline.org/index.php?option=com_content&task=view&id=68.

⁶⁹ Salvador Declaration at <http://www.icml9.org/channel.php?lang=en&channel=91&content=439>.

⁷⁰ Carlos Henrique Marcondes, Report on the Development of the SciELO-Open Archives Data Provider Server in SciELO D-Lib Magazine 9:3 (2003) at <http://www.dlib.org/dlib/march03/marcondes/03marcondes.html#8>.

⁷¹ The Brazilian Institute for Information and Science (Ibict) at www.ibict.br/ and the Open Access and Scholarly Information System (OASIS) at <http://oasisbr.ibict.br/sobre.php>.

⁷² For case review: Sílvia Barcellos Southwick, The Brazilian electronic theses and dissertations digital library: providing open access for scholarly information. (2006) at <http://www.scielo.br/pdf/ci/v35n2/a11v35n2.pdf>.

⁷³ The Wellcome Trust, Position Statement in Support of Open and Unrestricted Access to Published Research (march/2007) at http://www.wellcome.ac.uk/doc_WTD002766.html.

⁷⁴ Heather Morrison, The Dramatic Growth of Open Access: Implications and Opportunities for Resource in Journal of Interlibrary Loan, Document Delivery & Electronic Reserve, 16:3 (2006) at <http://hdl.handle.net/1892/510>.

⁷⁵ Rosemary J Coombe, Fear, Hope, and Longing for the Future of Authorship and a Revitalized Public Domain in Global Regimes of Intellectual Property DePaul Law Review 52 (2003) at http://www.yorku.ca/rcoombe/publications/Fear_Hope_and_Longing.pdf.

⁷⁶ Ahrash N. Bissell, Eric C. Kansa and Jason Schultz, Protecting Traditional Knowledge and Expanding Access to Scientific Data: Juxtaposing Intellectual Property Agendas via a “Some

Rights Reserved” Model International Journal of Cultural Property 12:3 (2005) at http://www.alexandriaarchive.org/IJCP%20Article%20FINAL_share.pdf

⁷⁷ For the outcomes from the CBD Working Group on the Article 8(j), refer to: <http://www.cbd.int/convention/wg8j.shtml>. A necessary addition to the discussion of the article 8(j) is the outcome from the Working Group on Access and Benefit Sharing at <http://www.cbd.int/convention/wgabs.shtml>.

⁷⁸ A report in Portuguese regarding the meeting I personally attended, in October 2006, in Belem do Para, Brazil, can be found at http://www.museu-goeldi.br/sobre/NOTICIAS/25_10_06_II%20Encontro%20da%20Rede%20Norte%20de%20Propriedade%20Intelectual,%20Biodiversidade%20e%20Conhecimento%20Tradicional%20come%20A7a%20amanh%C3%A3,.htm. As of October/2007 the results of this meeting, because of lack of funds, have not yet been published.

⁷⁹ The CDs distributed by the MIT Open Courseware (<http://ocw.mit.edu/OcwWeb/web/home/home/index.htm>) and other initiatives from the Open Educational Resources movement (<http://www.unesco.org/iiep/virtualuniversity/forums.php>) are great examples to create bridges.

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