Brazilian Open Access Initiatives: Key Strategies and Actions

Sely M S Costa[1]; Fernando C L Leite[2]

[1]Departamento de Ciência da Informação, Universidade de Brasília,
Campus Universitário Darcy Ribeiro, 70910-900 Brasília DF – Brazil
Phone: +5561 33071205, Fax: +5561 33673297, email: selmar@unb.br
[2]Gerência de Organização e Difusão da Informação, Embrapa Informação Tecnológica;
Universidade de Brasília, Parque Estação Biológica, PqEB, Av. W3 Norte (final)
70770-901 Brasília DF – Brazil
Phone: +5561 34484585 Fax: +5561 32724168 email: fernandodfc@gmail.com

Abstract

This overview of key Open Access (OA) strategies in Brazil over the last three years describes the guidelines, tools and methodologies needed for Brazil to become an effective actor in the worldwide open access movement. We review general trends and awareness of OA, as well as ongoing developments and policies, opportunities and challenges, both national and international. The institutionalization of Brazilian scientific research is described, along with advances in open access journals and repositories, as well as institutional and governmental policies and the problems that have slowed their progress. Among the major actions targeted recently are plans and actions specific to Portuguese-speaking countries, as well as international collaboration. We conclude with challenges and opportunities ahead.

Keywords: Learned publishing; Open Access journals; Open Access repositories; Governmental and institutional research policy; Lusophone collaboration; Brazil.

1. Introduction

Open Access (hereafter OA) in Brazil, aims at reflecting the so-called BBB definition (Budapest, Bethesda and Berlin declarations): "literature [that] is digital, online, free of charge, and free of unnecessary copyright and licensing restrictions. It removes both price barriers and permission barriers. It allows reuse rights which exceed fair use" [1]. Nevertheless, as can be seen in the work reported here, there have been a number of problems concerning the Brazilian initiatives that aim at implementing OA policies and actions in this country. This paper provides a picture of the two kinds of approaches taken: sensitising and real actions.

The first approach consisted in a number of meetings that have taken place in different states. Different types of academic institutions such as learned societies, research institutes and universities have conducted these meetings. The second approach consisted in the creation of OA journals and digital OA repositories, as well as service providers. Most of the actors involved in this second approach are likewise universities and research institutions.

This report is organised under six headings, which comprise the common outline adopted for papers presented at the special session on developing countries. We report Brazilian general trends in scientific output and publication, general OA awareness, the state of the art with open journals and digital repositories, policies, challenges, opportunities, as well as partnerships and collaboration at the international level.

2. General trends in scientific output and publishing in Brazil

Universities are the major settings for research worldwide. In Brazil this is particularly true, as it. was only in the twentieth century that our current major universities were founded, and only after the Second World War that a process of institutionalising scientific and technological development began , with all the initiatives for scientific and technological development in the country being guided by government actions.

In the 1950's and 1960's, the science and technology policies of the Brazilian Government were aimed at training researchers and creating and strengthening research teams. The National Research Council (CNPq) was created, alongside the Higher Education Personnel Training Campaign (CAPES) http://www.capes.gov.br/ , both in 1951. A more comprehensive process for supporting scientific and technological development started to appear, via two instruments implemented by these two institutions: scholarships and research funding. They envisaged, ultimately, the creation of a solid academic and scientific environment in Brazil.

The Financing Agency for Studies and Projects (FINEP), established in 1969, along with the National Scientific and Technological Development Fund (FNDCT), aimed to be the fundamental instruments for the support of scientific and technological development. Both the agency and the fund have been crucial for scientific and technological achievements in Brazil since then. Later, intense planning in the post-graduate and research sectors strongly linked research activities to post-graduate programmes.

From the 1990's, the Brazilian post-graduate sector became more consolidated as a result of a "stable and well-defined governmental policy"(7). Nowadays, both Brazilian Government bodies (at both federal and state levels) and business companies (both public and private) have been funding research in Brazil.

As may be expected, however, the Federal Government has been the major source of financial resources for research, particularly by means of grants and scholarships from CAPES, CNPq and FINEP. At the state level there are the Research Support Foundations, of which the most resourceful one is FAPESP (State of São Paulo). Brazilian researchers from some sectors can also count on grants and scholarships from research institutions such as Embrapa (The Brazilian Agricultural Research Corporation), the largest public research institution in the agricultural sector.

The participation of Brazilian research output on the worldwide stage is very small, though figures have gradually increased. According to some of the latest figures available, Brazilian researchers produced 1.8% of the world's scientific knowledge in 2005, with the largest contribution coming from medicine (2,508 journal articles), followed by physics with 2,204 articles. It is interesting to note that ca. 85% of the national scientific output is carried out by post-graduate programmes, with a total number of 3,325 masters and doctoral courses in 2005.

Researchers in any field are stimulated by CNPq to be organised in research groups, focusing on topics within their interest. These research groups have been in the lead for research production in the country, which, along with research investment, is mostly centred in the Southeast and South (as is the country's population).

Data in Table 1 show the breakdown of researchers in terms of the two major divisions of knowledge, namely, science, technology and medicine (STM) and social sciences and humanities (SS&H). "Researchers with doctorates" represent less than 70% of the total of researchers, hence considerable research is also being carried out by people without doctoral training.

Data in Table 2 show the breakdown of research groups by geographic region. The distribution of research groups (ca. 21,000), compared to the total number of researchers (ca. 100,000) in Table 1, shows that the average number of researchers in each group is around five. Concerning the geographical distribution of these research groups, it can be clearly observed that most of the research work carried out in Brazil is

concentrated in the south east, where major Brazilian universities are located. Three of these universities are the University of São Paulo, the University of Campinas, in the state of São Paulo, and the Federal University of Rio de Janeiro.

Division of Knowledge	Total of researchers (R)	Researchers with doctorates (D)	% (D) / (R)
STM	47,512	36,037	76.3
SS&H	54,672	31,668	58.3
Brazil	**102,184**	**67,705**	**67.3**

Table 1: Breakdown of researchers with doctorate, by major divisions of knowledge (2006)

Geographic region	Research Groups	%
Southeast	10.592	50,4
South	4.955	23,6
Northeast	3.269	15,5
Central-West	1.275	6,1
North	933	4,4
Brazil	**21.024**	**100,0**

Table 2: Breakdown of research groups by geographical region (2006)

With regard to scientific publication, Brazilian research output has increased significantly over the last decade. According to data available on the CNPq web page, gathered from researchers' CV at Lattes Platform (http://lattes.cnpq.br)1, the breakdown of publications from researchers with doctorates whose curricula are accessible shows a low level of production. Despite disciplinary differences, it is expected that researchers produce at least two publications per year on average. Nevertheless, as depicted in Table 3, the output per year does not achieve the average ideal. It is important to note that Lattes Platform covers ca. 85% of total Brazilian scientific output.

Type of output	Number of outputs (2003-2006)	Outputs per year	Number of outputs by researchers with doctorates per year
1. National journal articles	238,480	59,620	0,88
2. International journal articles	212,442	53,111	0,78
3. Conference papers	332,707	83,177	1,23
4. Books	21,778	5,445	0,08
5. Book chapters	113,522	28,381	0,42
7. Doctoral theses	35,753	8,938	0,13
8. Master dissertations	121,227	30,307	0,45
Brazil	**1,075,909**	**268,979**	**----------**

Table 3: Science &Technology production between 2003-2006, by type of output

In summary, the federal government (with the exception of the state of São Paulo) has funded most of the research and publication output of Brazil. This output is very small compared to global figures, for such reasons as shortage of money for research (project grants) and of scholarships for doctorate students, as well as language constraints.

3. General awareness of OA in Brazil

It is difficult to report precisely on the general awareness of OA in Brazil, as the requisite empirical data are not available. We accordingly discuss it indirectly by describing the initiatives carried out to promote OA. The promotion of OA in Brazil, as everywhere else, has faced many challenges. Both the Brazilian Institute of Information in Science and Technology (IBICT) and the Scientific Electronic Library Online (SciELO) have been involved with the movement, taking the lead on most of the initiatives in the country. There are two basic initiatives to report.

The first consists of declarations in support of OA that have been launched. From 2005, a number of declarations have been issued in Brazil, signed by either individuals or civil society entities through their representatives. So far, at least four major declarations have been issued in Brazil, following the Berlin Declaration. IBICT issued a declaration at the 57th Annual Meeting of the Brazilian Society for the Advancement of Science (SBPC). The other three were issued by the National Psychology Learned Society, by participants of an international conference in the health sciences (known as the "Salvador Declaration"), and by a group of researchers from the state of São Paulo, known as the "São Paulo Letter". The later two are available on IBICT's web page (in Portuguese only) (http://www.acessoaberto.org/). The Salvador Declaration is also available in English from http://www.icml9.org/meetings/openaccess/public/documents/declaration.htm.

The second kind of initiative consisted of a number of events to promote OA. Over the last three years, events that have taken place in Brazil and included OA in their programme consisted of:

- All three last annual meetings (57th, 58th and 59th) of SBPC. Their programmes with special sessions on OA can be found at the SBPC site at http://www.sbpcnet.org.br/livro/57ra/programas/CONF_SIMP/simposios/1.htm, http://www.sbpcnet.org.br/livro/58ra/atividades/ENCONTROS/listagem.html, http://www.sbpcnet.org.br/livro/59ra/programacaocientifica.html#EA.
- Annual meetings of learned societies in different fields of knowledge have also been the arenas for this sort of initiative. This has been the case of **information and library science**, which was the organiser of the Cipecc (Ibero American Conference in Electronic Publishing) event (http://portal.cid.unb.br/cipeccbr); the last two annual meetings of the National Association of Information and Library Science Research (Enancib - www.ancib.org.br); and the National Seminar on University Libraries (SNBU - http://www.snbu2006.ufba.br/). Also researchers and practitioners from the **health sciences** have organised the 9th World Congress in Health Information and Libraries (http://www.icml9.org/). The last three annual meetings of **communication science** have included OA topics in their programmes. These discussions can be found at • (http://www.portcom.intercom.org.br/www_antigo2/index.php?secao=projetos/endocom). Finally, **psychology** researchers ran the annual meeting of 2006 with OA being discussed and a manifesto issued. (http://www.anpepp.org.br/index-grupoXI.htm).
- The First Cipecc - Ibero American Conference in Electronic Publishing in the context of Scholarly Communication, ran very successfully in Brasilia, April 2006. There were participants from 6 countries (Mexico, Chile, Portugal, Spain, Brazil and Canada), and 13 Brazilian states, spanning from the North to the South of the country and totalling 101 delegates. It offered a unique opportunity to make open access, institutional repositories and other topics known and discussed by people from Ibero America as a whole and Brazil in particular. The conference website contains all papers and presentations. The Second Cipecc will take place in Rio de Janeiro in November 2008 and also aims at publicising and discussing OA in Brazil and Ibero America.

Despite these endeavours, however, little has been achieved. Although significant steps have been taken by some of the government funding agencies, so far they have not been fully supportive, mostly because they still lack sufficient awareness of OA. It has therefore been decided to adopt new strategies.

At the events, there has always been the same "audience" in attendance, mostly comprising information scientists and practitioners. Most of the scholarly and scientific communities (i.e., the researchers themselves) remain unaware of the real meaning, potential and benefits of OA. The same applies to decision makers at universities and research institutions.

Hence, Brazil has seen few concrete undertakings as yet, despite the recognition that all these endeavours have had some effect on the previous profound and widespread unawareness on the part of the Brazilian scholarly community regarding OA. A great deal of both action and research on this issue is still needed.

4. OA journals and OA repositories in place and in development

One of the major OA initiatives in Brazil is the creation of online, open access electronic scholarly journals. In this, the Open Journal Systems, from PKP, Canada, has been the cornerstone. The package has been translated into Portuguese, and customised to fit Brazilian journals. Training programmes established by IBICT allowed more than 700 people to learn to use OJS in the majority of higher education institutions. So far, more than 360 Brazilian journals have been created and maintained by means of OJS in a variety of disciplines.

Table 4 shows the number of titles in terms of the two major divisions of knowledge. In order to give support to institutions unable to create their own journals, IBICT has recently launched a journal incubator (INSEER - http://inseer.ibict.br/index.php?option=com_frontpage&Itemid=1). INSEER is a service that supports and stimulates the creation and maintenance of OA scholarly journals on the Internet. This is expected not only to give rise to new journals but also, and mainly, to support the sustainability of both new and existing titles. This will undoubtedly help increase and improve figures in the country, in this regard.

Major divisions of knowledge	Number of Titles (OJS)
STM	95
SS&H	270
Brazil	**365**

Table 4: Breakdown of scholarly journals created by means of OJS and accessible through IBICT's portal

Along with OJS, SciELO is another major OA scientific and scholarly journals service in terms of both recording and disseminating. There are now more than 230 Brazilian titles in its collection, from different divisions of knowledge (Table 5). The major work of SciELO is to produce electronic versions of journals and then make them available and searchable through its platform in an interoperable environment. The service provides a statistics module that can generate the metrics widely used in the country as quality indicators.

SciELO now has a collection of journals from 8 countries in Latin America, Caribbean and Europe, namely Argentina, Brazil, Chile, Colombia, Spain, Portugal and Venezuela, with a total of 553 titles in its entire collection. There are also ongoing implementations of journals from Mexico, Jamaica, Costa Rica, Paraguay, Peru and Uruguay.

Concerning repositories, figures in Brazil are disappointing. So far, there are few (around 6 and others underway) university repositories implemented in the country, even though they concern the major focus

of the sensitising approach carried out by OA stakeholders. Taking into account that there are 266 universities (142 from the public sector and 124 from the private sector) in Brazil, figures are expected to be higher than that. In fact, the "Green Road" to OA (author self-archiving of non-OA journal articles in Institutional Repositories) http://www.nature.com/nature/focus/accessdebate/21.html does not yet constitute a reality in Brazil. Despite all the software translation, customisation and dissemination that IBICT has carried out over the last five years or so, very few successful initiatives have been registered within universities and research institutions. The difficulties seem to be related to a continuing lack of awareness of OA. Technical difficulties are no longer a problem at all (despite some remaining concern about computer personnel).

Major divisions of knowledge	Number of Titles (SciELO)
STM	157
SS&H	81
Brazil	**238**

Table 5: Breakdown of scholarly journals available at SciELO

Nevertheless, concrete progress in Brazil is now underway, and both the approved Bill as well as CAPES (See Section 5: policy development), provide the evidence. It is interesting to highlight two initiatives:

- The Digital Library of the National Institute of Space Research (Inpe), available at: http://bibdigital.sid.inpe.br/col/sid.inpe.br/bibdigital%4080/2006/11.11.23.17/doc/mirror.cgi. The software used to host the data has been developed entirely by Inpe's technicians, who also created persistent identifiers and a number of other resources needed to guarantee access and control. Figure 1 shows the home page of Inpe's digital library.
- The Digital Library of the University of Campinas (Unicamp), in São Paulo, available at: http://libdigi.unicamp.br. Like Inpe, Unicamp works with a software developed and maintained by its technicians. In both cases, the standards are OAI compliant and open access. Figure 2 shows the home page of Unicamp's digital library.

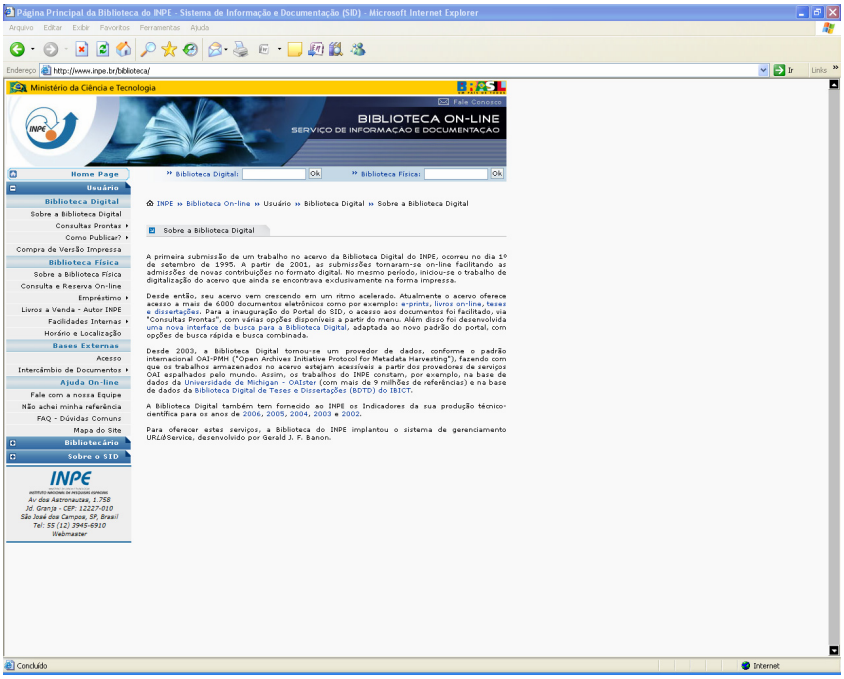

Figure 1: Snapshot of Inpe digital library home page

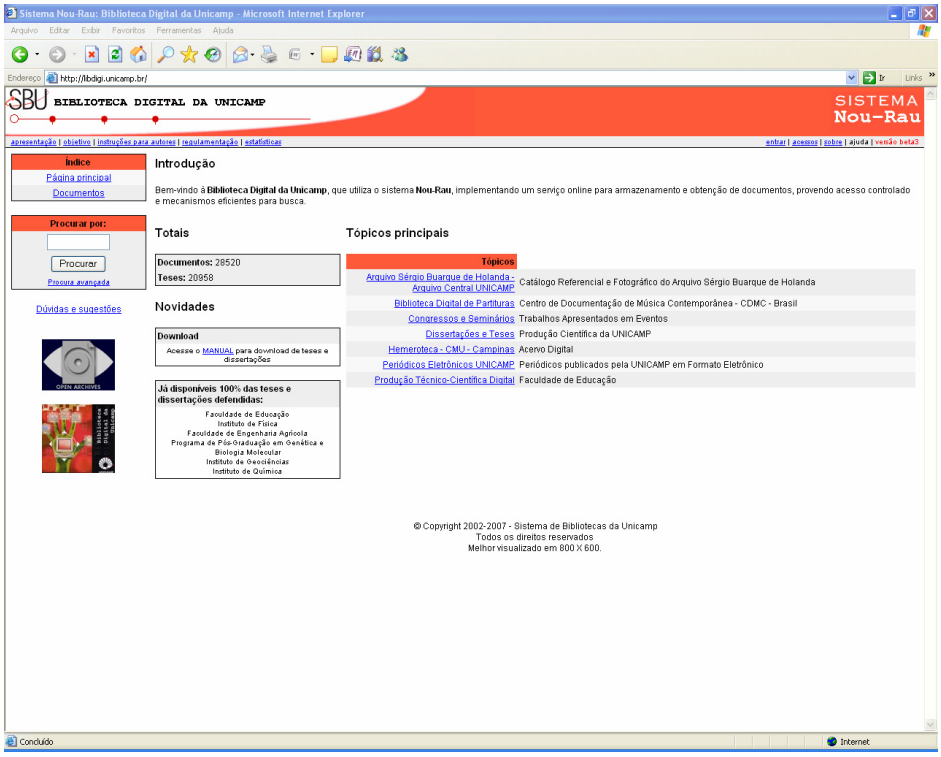

Figure 2: Snapshot of Unicamp digital library home page

There are 6 DSpace and 4 EPrints installations in Brazil registered in ROAR http://roar.eprints.org/. Some of the government initiatives, i.e. initiatives from the public administration sector, make successful use of DSpace in Brazil:

- BDJur Consortium, which comprises a network of digital libraries from the judiciary sector. The consortium uses Dspace and PKP metadata harvester, and is accessible at: http://www.consorciobdjur.gov.br
- Virtual Library on Corruption, a partnership between a Brazilian judiciary body and the United Nations Office on Drugs and Crime (Unodc), available at http://bvc.cgu.gov.br.

A successful initiative in Brazil has also been implemented by the Antônio Carlos Jobim Institute using DSpace. The institute collection was created with the aim of having Tom Jobim's multimedia collection well managed and is available at http://www.jobim.org/manakin.

Concerning scientific information, it is currently the Digital Library of Theses and Dissertations (BDTD) that is the most successful OA initiative in Brazil, with ca. 70,000 theses and dissertations available. It is noteworthy that this success arises from the fact that CAPES has adopted a mandatory Green OA self-archiving policy, requiring post-graduate programmes in Brazil to make their theses and dissertations available on the Internet. Currently, BDTD collects and makes available theses and dissertations from 77 higher education institutions. The strategic diffusion model of BDTD programme seems to correspond to Brazilian needs. It consists of launching public calls that aim at higher and further education institutions with post-graduate programmes. The support given includes hardware, software, methodology and training. The selection process takes account of a number of requirements, among them the existence of a team composed of computer personnel who will be responsible for both implementing and operating the local digital library of ETD's. Brazil is one of the biggest contributors to NDLTD.

A further very promising development in Brazil is the creation of a national web portal of OA initiatives at IBICT's server, named Oasis.br (Brazilian Open Access Scientific Information System), which should

encompass both e-journals and institutional repositories. It has been envisaged as an important twofold step. First, it is expected to serve as a tool for journals and repositories to be registered and, consequently, it will be a service provider for Brazilian OA output. Second, both journals and repositories must be compliant with the portal policies and quality criteria for being registered. This, in turn, aims at ensuring the quality and sustainability of Brazilian research output.

In conclusion, the "Gold road" to OA (OA journal publishing) http://www.nature.com/nature/focus/accessdebate/21.html is well implemented in Brazil, with high possibility for improvement, despite a great need of quality and sustainability policies for journals created by means of OJS. There does not seem to be a need for increasing, but rather for improving the collection of OJS journals. SciELO journals are assessed in advance, which is a guarantee of their quality. OJS journals, however, because of OJS's freedom and ease of use, show a greater need for improvement. The Green road to OA of self-archiving is still a dream, mostly because of the continuing low level of awareness among Brazilian scholars and scientists, as well as university librarians, funding agency personnel and university decision makers. This dream, however, has a high chance of becoming a reality thanks to the efforts of IBICT and other stakeholders.

5. Policy development

One of the most significant steps towards OA in Brazil, as the result of its stakeholders' efforts, is the recent approval of Bill 1120/2007 by the Science and Technology Commission of the Brazilian Chamber of Deputies. This Bill defines policies for the country that require mandatory deposit, in a university repository, of research results publications resulting from research projects funded by public institutions. This is, indeed, an important step, despite being a manifestation of the country's overall top-down approach. It is interesting to note that no bottom-up approach (i.e., researcher voluntarism) tried so far has achieved positive results, in Brazil. According to Harnad (comments given personally) "Likewise anywhere else in the world, except in the special case of High Energy Physics. In contrast, researchers state http://eprints.ecs.soton.ac.uk/11006/ , and outcome studies confirm http://fcms.its.utas.edu.au/scieng/comp/project.asp?lProjectId=1830 , that mandates successfully generate near-100% OA within 2 years of implementation." Kirsop (comments given personally), however, considers that "many of the existing >1300 IRs resulted from hard work in departments of universities and institutes – i.e. the IISc in Bangalore, Southampton and Tasmanian universities and so on – very little top-down help, and almost all happened because the department staff 'just did it'.

Another highly effective decision that helps OA implementation in Brazil is the CAPES normative act that requires higher and further education institutions both to create a digital library of theses and dissertations and to effectively deposit all theses therein. In addition, the CNPq programme that funds scholarly and scientific journals states that if a research proposal's published results are to be made OA, then it has higher chances of receiving funding than if it is not.

Finally, a Task Force was established in October 2007, involving seven major Brazilian universities representing the five geographical regions with the aim of initiating OA promotional efforts within those universities and then propagating them to others. The modus operandi initially defined has not yet proved very successful and is now being reviewed. However, one important outcome has been to create the University of Brasilia repository and to use it as a pilot for the entire country, starting with the other six universities of the Task Force. The University of Brasilia is expected to be the first Brazilian university to implement a mandatory deposit policy http://www.eprints.org/openaccess/policysignup/ and this may occur shortly.

6. Opportunities and challenges

Based on the picture described so far, three important issues need to be tackled in Brazil; they accordingly represent, the country's biggest challenges. The first is the lack of a good infrastructure for the scientific publication system. This can actually be seen as a great opportunity for the adoption of the new publication and dissemination models and technologies available nowadays. Brazil is one of the main users of OJS, with one of the highest numbers of titles created through the system. Another advantage of this lack of infrastructure is that the country does not face any battle with the publishing industry, as seen in the developed world. The great challenge, in this sense, is to remedy the unawareness of the scholarly community, particularly that of individual researchers themselves.

The second important issue is that most of those responsible for OJS journals, for example, have well mastered the use of the software itself, but know very little about the publication system in particular, and the scholarly communication process in general. This also represents a huge challenge for OA stakeholders in Brazil, and a difficult one to overcome. The same applies to DSpace, EPrints and other resources being used in the country.

Finally, the information technology practitioner community seems unaware of the OA movement. Considering the importance of this community as key players in developing and implementing the Green and Gold approaches to OA, the country urgently needs to raise awareness of OA among these people and persuade them to collaborate.

Opportunities and potential benefits include the free use of all available electronic resources, international collaboration and cooperation, an increasing presence of Brazilian researchers and practitioners at international conferences, more visiting of experts to the country itself but, above all, the greatly increased research access, usage and impact: http://opcit.eprints.org/oacitation-biblio.html

7. International collaboration and ways forward

In November 2006, a group of researchers from Brazil, along with researchers and librarians from Portugal, and Mozambique, held a meeting at the University of Minho, in Portugal, to discuss the OA movement in Portuguese speaking countries. The programme of the meeting is available at http://www.sdum.uminho.pt/confOA/programa.htm. From this meeting, the Minho Commitment emerged as an important document for this community. The document is available in both Portuguese and English at http://www.ibict.br/openaccess/arquivos/compromisso.pdf.

As a follow-up, the Open Access Seminar to the Scientific Knowledge in Portuguese Speaking Countries took place on November 13th, 2007,as part of a major event organised by the Internet Governance Forum. The programme is available at http://www.intgovforum.org/Rio_Schedule_final.html. The event took place in Rio de Janeiro, as part of a Brazil/United Nations meeting (http://www.intgovforum.org). Experts, researchers, librarians and government representatives jointly discussed the theme. Representatives of 8 Portuguese-speaking countries signed up to the Rio de Janeiro Protocol, which establishes their agreement to the aims of the Minho commitment. Further developments are on the agenda of both University of Minho, in Portugal, and IBICT, in Brasilia. More discussion and action are needed in order fully to implement the Minho Commitment.

Oasis.br and INSEER, already mentioned, are expected to complement efforts made by SciELO and Qualis by working in collaboration with Bireme and CAPES. The former (SciELO) is a collection of journals that share well-defined criteria for inclusion. The latter (Qualis) is a Brazilian programme implemented by CAPES to assess journals. CAPES is a federal agency responsible for assessing research and post-graduate work in Brazil. This should help guarantee journal quality and sustainability by defining Oasis.br assessment criteria both for the journals that are to be registered for the portal and for journal

publishers themselves. It should also set quality criteria for journals created by means of INSEER.

Oasis.br aims at promoting both the green and the gold roads to OA. The gold road comprises methodology, strategies and criteria to either create or migrate scholarly journals using OJS. The green road consists of defining methodology, strategies and guidance for the creation and filling of institutional repositories at universities. All these actions will need to take into account disciplinary differences among scholarly communities, particularly in terms of criteria to be defined. One special concern is to take into account Brazil's own reality and context, as a developing country in which the lack of skilled personnel is still a great problem. Partnership with people from well-equipped institutions, such as PKP (Canada), University of Minho (Portugal), and E-LIS are under discussion and should result in training programmes.

8. Concluding remarks

Brazil has definitely been prominent on the agenda of the worldwide Open Access movement, thanks to a few stakeholders. Since Elpub2003 in Portugal, Brazilian researchers and technicians began to carry out work on OJS, DSpace and EPrints, which were already being considered by IBICT's personnel. Apart from the pioneering OA initiative by SciELO, since its beginnings in the late 1980's (though without an interoperable environment till very recently), the involvement of the Brazilian scholarly community with OA dates from 2003.

Since then, a huge effort has been made to involve Brazil prominently in worldwide OA developments. Concrete achievements, however, have so far not been very impressive. There still remain long and wide roads to be traversed, not just Green and Gold, but, as provocatively expressed in the FEST programme (http://www.festrieste.it): top-down or bottom-up?

Costa's response: both top-down and bottom-up! Brazil needs the problems of OA implementation to be tackled by librarians, researchers and computer technicians who can persuade decision makers to provide the support needed. This would represent the bottom-up approach, which corresponds to the **sensitising** approach mentioned earlier. At the same time, the country needs decisions to be made by both the government as a whole (legislative, judiciary and executive branches), and the research institutions, universities and funding bodies. It is understood that if these bodies establish policies for the country as a whole, this will help the scholarly community, defined in its largest sense, to follow.

A synergy between top-down and bottom-up approaches appears optimal. This will constitute **real action** and requires strong involvement and advice from all key stakeholders. Let the country, therefore, go ahead and do it! Hope springs eternal.

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9. Notes

[1] Lattes Platform is a system that provides a very comprehensive record of the Brazilian researchers activities concerning teaching, research, administrative positions, and so forth. In summary, a real comprehensive CV record from which it is easy to assess research work in the country.

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