ROLE OF OPEN ACCESS IN THE EMERGENCE AND CONSOLIDATION OF REFEREED JOURNALS IN LATIN AMERICA AND THE CARIBBEAN

PAPEL DEL ACCESO ABIERTO EN EL SURGIMIENTO Y CONSOLIDACIÓN DE LAS REVISTAS ARBITRADAS EN AMÉRICA LATINA Y EL CARIBE.

PAPEL DO ACESSO ABERTO NO SURGIMENTO E CONSOLIDAÇÃO DAS REVISTAS DIRIGIDAS NA AMÉRICA LATINA E CARIBE.

Jorge Delgado Troncoso

RESUMEN

Propósito: Analizar el papel del acceso abierto in el crecimiento de revistas arbitradas en América Latina (AL&C) en los ámbitos nacional, regional y global. **Métodos**: La información provino de dos fuentes: 1) seis importantes bases de datos/índices (OpenDOAR, DOAJ, OJS, Dialnet, SciELO y RedALyC; 2) Notas de 175 entrevistas a profundidad efectuadas entre 2008 y 2010 con editores de revistas, autoridades universitarias, personal gubernamental, agentes de organizaciones internacionales y otros expertos. Las entrevistas se realizaron en Argentina, Brasil, Chile, Colombia, México, Uruguay y Venezuela. Las bases de datos/repositorios son usadas para describir la presencia de revistas latinoamericanas por región y país. Son organizados en tablas y analizados descriptivamente. **Resultados**: SciELO tenía 816 revistas, 21.324 fascículos y 314.758 documentos/artículos; RedALyC tenía 758 revistas, 14.381 fascículos y 177.017 artículos. Dialnet incluía 7.168 revistas, 3.246.415 documentos y 2.230.929 artículos. 1.190 revistas (18.52%) de AL&C formaban parte de DOAJ. Colombia es el país con el segundo mayor número de revistas en RedALyC después de México y en SciELO después de Brasil. **Conclusión**: AL&C tiene una fuerte presencia de revistas de acceso abierto en repositorios internacionales y regionales, lo que aumenta la visibilidad de las publicaciones de la región y la posibilidad de desarrollar redes académicas. Directorios regionales como Latindex y repositorios/índices como RedALyC y SciELO han tenido un gran impacto en el desarrollo de las revistas latinoamericanas. Dos factores parecen estar apoyando el surgimiento de un modelo de publicación académica en AL&C: la publicación open Access y los repositorios e índices/bases bibliográficos regionales.

Palabras clave: Acceso abierto, revistas arbitradas, repositorios regionales, índices bibliográficos regionales

ABSTRACT

Purpose: Analyze the role of open access in the growth of Latin American (LA&C) refereed journals at the national, regional, and global levels. **Methods**: Data came from two sources: 1) six of the main open access databases/repositories (OpenDOAR, DOAJ, PKP's OJS, Dialnet, SciELO, and RedALyC; 2) Notes taken during 175 in-depth semi-structured interviews that were conducted between 2008 and 2010 with journal editors, university authorities, government staff, international organization officials, and other experts. The interviews were carried out in Argentina, Brazil, Chile, Colombia, Mexico, Uruguay, and Venezuela. Findings from the databases/repositories are used to describe the presence of LA&C journals as a region and by country. They are organized in tables and analyzed descriptively. **Results**: SciELO had 816 journals, 21,324 issues, and 314,758 documents/articles; RedALyC had 758 journals, 14,381 issues, and 177,017 articles. Dialnet included 7,168 journals, 3,246,415 documents, and 2,230,929 articles. 1,190 journals (18.52%) from LA&C were included in DOAJ. Colombia is the country with the second highest number of journals in RedALyC after Mexico and in SciELO after Brazil. **Conclusion**: LA&C has a strong presence in international and regional repositories of open access journals, which increases the visibility of the region's publications and the possibility of developing academic networks. Regional directories like Latindex and repositories/indexes such as RedALyC and SciELO have had a major impact on the development of LA&C journals. Two factors seem to be supporting the emergence of a model of scientific/scholarly publication in LA&C: open access publication and regional repositories and databases/indexes.

Keywords Open Access, refereed journals, regional repositories, regional bibliographic indexes

RESUMO

Propósito: Analisar o papel do Acesso Aberto no crescimento de revistas dirigidas na América Latina (AL&C) nos âmbitos nacional, regional e global. **Métodos**: A informação foi oriunda de duas fontes: 1) Seis importantes bases de dados/índices (OpenDOAR, DOAJ, OJS, Dialnet, SciELO e RedALeC; 2) Notas de 175 entrevistas realizadas em profundidade entre 2008 e 2010 com editores de revistas, autoridades universitárias, pessoal governamental, agentes de organizações internacionais e outros especialistas. As entrevistas foram realizadas em Argentina, Brasil, Chile, Colômbia, México, Uruguai e Venezuela. As bases de dados/ documentos são usadas para descrever a presença de revistas latino-americanas por região e país. São organizados em tabelas e analisados descritivamente. **Resultados**: SciELO tinha 816 revistas, 21.324 fascículos e 314.758 documentos/ artigos; RedALeC tinha 758 revistas, 14.381 fascículos e 177.017 artigos. Dialnet incluía 7.168 revistas, 3.246.415 documentos e 2.230.929 artigos. 1.190 revistas (18.52%) de América Latina e Caribe (AL&C) faziam parte de DOAJ. Colômbia é o país com o segundo maior número de revistas em RedALeC depois do México e em SciELO depois do Brasil.
Conclusão: AL&C têm uma forte presença de revistas de Acesso Aberto em documentos internacionais e regionais, o que aumenta a visibilidade das publicações da região e a possibilidade de desenvolver redes acadêmicas. Diretórios regionais como Latindex e documentos/índices como RedALeC e SciELO têm um grande impacto no desenvolvimento das revistas latino-americanas. Dois fatores parecem estar apoiando o surgimento de um modo de

publicação acadêmica na AL&C: a publicação Open Access e os documentos e índices/bases bibliográficos regionais.

Palavras-Chaves: Acesso Aberto, revistas dirigidas, documentos regionais, índices bibliográficos regionais.

INTRODUCTION

Latin American and Caribbean (LA&C) scholars/researchers and refereed/peer-reviewed journals have faced many obstacles and challenges to be more visible and to have a greater participation in the scientific arena worldwide (Borrego & Casal, 2006; Buela-Casal et al., 2006; Delgado, 2010; Torres & Schugurensky, 2002; Utges, 2008). Their contribution to scholarship in most research and scientific fields has been modest. However, in the last two decades, refereed journals, those that publish research results and scholarly work, have experienced an impressive quantitative and qualitative growth (Holdom, 2005; RICYT, 2007, Fischman et al., 2010).

The growth of peer-reviewed journals is a response to the lack of access for LA&C researchers/scholars to the most prestigious publications and for regional publications to the mainstream bibliographic indexes and databases (Torres & Schugurensky, 2002; Borrego & Cristóbal, 2006). Reasons for that isolation could be found in the lack of research tradition (Rama, 2006; Didriksson, 2008; Pires et al., 2008; Salmoilovich, 2008), the weakness of existing university press units in LA&C (Rama, 2006; Uribe, 2006), the languages spoken in the region (mostly Spanish and Portuguese) in opposition to the international academic language (English) (Borrego & Cristobal, 2006; Buela-Casal et al., 2006; Alperín et al., 2008; Steenkist, 2008; Utges, 2008), and mistrust and undervaluing of LA&C scholars/researchers and journals (Odlyzko, 1998). Other reasons for the little development of research and science in LA&C, including its publications, are the low government investment in research and development, the little emphasis on research of the LA&C model of university, and the import of foreign research and technology rather than local generation of knowledge (de Moura Castro et al, 2001; Rama, 2006; Balán, 2007; Lemarchand, 2010).

The growth of LA&C refereed journals has been mediated by two global conditions: the development of electronic publication and online repositories (internet warehouses of documents) as a result of the advances in information and communication technologies (ICTs), and the open access movement that promotes free access to knowledge through electronic

publication (Hedlund et al., 2004; Holdom, 2005; Farga Medin et al., 2006; Willinsky, 2006). At the regional level, journal multiplication has been fostered by the creation of open access repositories and bibliographic databases and indexes, projects that started as local initiatives but have been expanding and strengthening throughout the region (Farga Medin et al., 2006; Landinelli, 2008; Steenkist, 2008). There are also national factors such as the enactment of higher education and S&T policy (that in some cases include local journal evaluation systems) and agencies upgrade (Gómez, 1999; de Moura Castro et al., 2001; Charum, 2004; CNIH et al, 2006; Colciencias, 2006; Rama, 2006; Didriksson, 2008; Vessuri et al., 2008; Villanueva et al., 2008; Aguirre-Bastos & Gupta, 2009), the creation of incentives for publication in indexed journals, and the development of accreditation systems that value institutional publishing capacities (Bernasconi, 2008; Pires et al., 2008).

The aim of this paper is to analyze the role of open access in the growth of LA&C refereed journals at the national, regional, and global levels. At the global level, initiatives such as the Public Knowledge Project with its Open Journal System have positively impacted the publication of open access journals by providing management and technological tools and support. The LA&C region has been exemplary with the development of open access repositories and bibliographic indexes such as the *Red de Revistas Científicas de América Latina y el Caribe, España y Portugal* (RedALyC) [Network of Scientific Journals from Latin America, the Caribbean, Spain, and Portugal] from the Autonomous University of the State of Mexico (UAEM), the Scientific Electronic Library Online (SciELO) originated in Brazil with the sponsorship of the Pan-American Health Organization and the Sao Paulo State Foundation for Research Promotion (FAPeSP), the Latin American Council of Social Sciences (CLACSO), and the *Sistema Regional de Información en Línea para Revistas Científicas de América Latina, el Caribe, España y Portugal* (Latindex) [Regional Online Information System for Scientific Journals from Latin America, the Caribbean, Spain, and Portugal] from the National Autonomous University of Mexico. At the national level, there are many differences among countries.

Data for this paper come from notes taken during interviews conducted between 2008 and 2010 with journal editors, university authorities, government officials, international organization personnel and other experts from some of the largest economies in the region that lead the movement; however, it is possible to identify some regional trends using the other

sources of data. Other data were obtained from databases from regional projects such as RedALyC, SciELO, and RICYT.

DATA COLLECTION AND ANALYSIS

Data for this paper comes from two kinds of sources: 1) six of the main online databases/repositories that include most of the open access journals from Latin America and the Caribbean. They are the Directory of Open Access Repositories (OpenDOAR), the Directory of Open Access Journals (DOAJ), the Public Knowledge Project's Open Journal System, Dialnet, the Scientific Electronic Library Online (SciELO), and RedALyC. 2) Notes taken during 175 in-depth semi-structured interviews that were conducted between 2008 and 2010 with journal editors, university authorities, government staff, international organization officials, and other experts. The interviews were carried out in Argentina, Brazil, Chile, Colombia, Mexico, Uruguay, and Venezuela.

Findings from the databases/repositories are used to describe the presence of Latin American and Caribbean journals as a region and by country. They are organized in tables and analyzed descriptively. The only data that somehow shows changes in time of LA&C journals is DOAJ. The rest show current presence. On the other side, the interviews provide some insight from some of the actors and/or people related to open access refereed journal publication in the region. Analysis of these data is qualitative.

RESULTS

Before starting to analyze open journals in LA&C, gross numbers of journal publication obtained from Latindex, the most comprehensive database of journal titles from LA&C, Spain and Portugal, are presented. Latindex has a directory with most of the titles in the region and a catalogue that includes those publications that meet the index's quality criteria (33 for print and 36 for electronic journals) (Latindex, 2011). As of 04/23/2011 at 11:00 a.m. EST, the Latindex catalogue had 14,850 titles from LA&C and 19,307 titles from LA&C plus Spain and Portugal. The Latindex catalogue had, in the most recent up-to-date report (04/04/2011), 5,012 titles.[1] It also includes 3.878 links to electronic journals; however, Latindex does not specify if those

[1] The Latindex directory lists journal titles whether they are currently being published or not.

journals are part of the directory and/or the catalogue and if they are open access or not (www.latindex.unam.mx).

General findings from the databases

Table 1 shows the distribution of open access journals (SciELO and RedALyC) and open access repositories (OpenDOAR) by country and by aggregates (database totals, LA&C as a whole, LA&C region plus Spain and Portugal, and totals from Spanish- and Portuguese-speaking LA&C countries). As of 04/23/2011, SciELO had 816 journals, 21,324 issues, 314,758 documents/articles, and 6,546,535 citations in the database. The most recent update from 04/22/2011 had included 85 new issues and 14 new journals (www.scielo.org). On the other hand, RedALyC had in 04/23/2011 758 journals, 14,381 issues, and 177,017 articles (www.redalyc.com).

Table 1. LA&C journals and repositories in SciELO, RedALyC and OpenDOAR by country and region

Region/Country	SciELO		RedALyC	OpenDOAR
	Titles	Current		
Argentina	75	74	41	14 (0.72%
Bolivia	6	6	--	2 (0.1%)
Brazil	253	226	117	49 (2.52%)
Chile	93	84	66	7 (0.36%)
Colombia	106	106	139	15 (0.77%)
Costa Rica	11	6	16	5 (0.26%)
Cuba	36	36	20	4 (0.21%)
Dominican Republic	--	--	1	2 (0.1%)
Ecuador	--	--	3	14 (0.72%)
El Salvador	--	--	--	2 (0.1%)
Guadaloupe	--	--	--	1 (0.05%)
Guatemala	--	--	--	--
Guyana	--	--	--	--
Haiti	--	--	--	--
Honduras	--	--	--	--
Jamaica	--	--	--	3 (0.15%)
Mexico	76	68	169	16 (0.82%)
Nicaragua	--	--	--	1 (0.05%)
Panama	--	--	--	--
Paraguay	3	3	--	1 (0.05%)
Peru	34	34	11	11 (0.57%)
Portugal	34	34	8	37 (1.9%)
Puerto Rico	--	--	4	1 (0.05%)
Spain	46	46	99	71 (3.65%)
Trinidad and Tobago	--	--	--	1 (0.05%)
Uruguay	5	5	1	1 (0.05%)
Venezuela	49	49	56	10 (0.51%)
World/repository total	816	--	758	1,943 (100%)
Latin America & the Caribbean	744	694	644	158 (8.13%)
Latin America, Spain & Portugal	824	774	751	266 (13.69%)
Spanish- and Portuguese-speaking	744	694	644	153 (7.87%)

Latin America & the Caribbean

Sources: www.scielo.org, www.redalyc.org, www.opendoar.org. Retrieved : 04/23/2011

The Directory of Open Access Repositories – OpenDOAR provides indirect access to the journals through the repositories it includes. On 04/23/2011, OpenDOAR registered a total of 1,943 repositories, of which 124 (6.38%) were from South America, 12 (0.62%) from the Caribbean, and 8 (0.41%) from Central America, totaling 158 repositories when adding Mexico. This database classifies repositories by type. From a total of 5,852 repositories in this category[2], 1,271 (21.72%) include journal articles. OpenDOAR also classifies repositories by language. In this category (total number of repositories: 2,687), 1,470 (54.71%) repositories were published in English, 191 (7.11%) in Spanish, and 91 (3.39%) in Portuguese (total: 282 Spanish and Portuguese repositories –15.5%-)[3] (www.opendoar.org).

The most recent data posted in 12/2010 in the open access journal repository Dialnet included 7,168 journals, 3,246,415 documents, and 2,230,929 journal articles (68.72%). The website does not show data by country or region. Only 13% documents included in Dialnet are full text (dialnet.unirioja.es).

One of the most influential projects supporting the publication of open access journals is the Public Knowledge Project (PKP). Among other products, PKP developed a platform and journal management system, the Open Journal Systems (OJS). Besides being OJS downloadable free of charge, PKP offers storage service and technical support for a reasonable price to those journal projects that require it. Governments, institutions, and individuals can download OJS and publish open access journals. Editors can even modify OJS to accommodate the layout to their particular publishing needs. As reported in 01/2010, from a total of 5,044 journals registered in OJS, there were 1,537 (30.47%) published in South America and 1,343 (26.63%) in North America (Canada, Mexico, and the United States), Central America and the Caribbean. The site does not provide more detail. In addition, these statistics only represent the journals that use OJS and are registered in the website (http://pkp.sfu.ca/ojs-geog). However, the presence of LA&C in the OJS journal database is considerable.

[2] Numbers in the category "type of repository" are higher than the total number of repositories in the database, since each repository can include more than one kind of material, that is, journal articles, books, institutional documents, etc.

[3] Similarly to the previous category, repositories can be published in more than one language.

One of the world's largest collections of open access journals is the Directory of Open Access Journals (DOAJ). Statistics from the DOAJ website provide interesting data to evaluate the growth of LA&C journals between 2002 and 2011 by country and aggregated as a region (Table 2). The whole LA&C region had in 04/23/2011 1,190 journals in the repository (18.52%) from a total of 6,424 publications. Journals from Spanish- and Portuguese-speaking Latin American and Caribbean countries totaled 1,185 titles (18.45%). Both indicators would show the importance of open access in the region when considering that the United States has 1,222 journals in DOAJ (19.02%) (www.doaj.org).

Table 2. Latin American and Caribbean journals in the Directory of Open Access Journals (DOAJ)
Numbers by yearly additions and totals between 2002 and 2011

Rank	Country	Number of journals added into DOAJ										Total number of journals in DOAJ									
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1	United States	20	202	90	93	69	108	212	175	188	65	20	222	312	405	474	582	794	969	1157	1222
2	Brazil	0	8	117	48	52	59	73	44	136	46	0	8	125	173	225	284	357	401	537	583
4	Spain	0	6	20	63	50	27	62	30	77	27	0	6	26	89	139	166	228	258	335	362
12	Colombia	0	2	2	5	19	17	18	26	19	15	0	2	4	9	28	45	63	89	108	123
13	Chile	0	3	41	19	13	7	14	10	14	2	0	3	44	63	76	83	97	107	121	123
18	Mexico	0	1	4	23	19	13	14	7	10	2	0	1	5	28	47	60	74	81	91	93
19	Argentina	0	0	1	9	10	14	14	8	28	3	0	0	1	10	20	34	48	56	84	87
22	Venezuela	0	3	35	6	16	3	7	6	5	1	0	3	38	44	60	63	70	76	81	82
28	Portugal	0	1	1	0	7	6	9	14	9	3	0	1	2	2	9	15	24	38	47	50
35	Cuba	0	0	13	4	2	1	1	2	7	3	0	0	13	17	19	20	21	23	30	33
46	Costa Rica	0	0	4	0	3	1	5	1	3	3	0	0	4	4	7	8	13	14	17	20
49	Peru	0	0	0	3	4	2	4	3	2	0	0	0	0	3	7	9	13	16	18	18
65	Puerto Rico	0	0	0	2	2	1	2	0	2	0	0	0	0	2	4	5	7	7	9	9
75	Uruguay	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	1	3	4	4
77	Bahamas	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	2	2	2	3
81	Bolivia	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	1	1	2	3
84	Ecuador	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	2	2	2	2	2
86	Guatemala	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2
95	Nicaragua	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1
98	Dominican Republic	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1
103	Barbados	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
105	Jamaica	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1
108	Paraguay	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1
	World Total																				6424

Source: www.doaj.org. Retrieved: 04/23/2011

Descriptive analysis by country

The analysis by country is based on the main regional journal repositories, SciELO and RedALyC (Table 1), as well as the global DOAJ (Table 2). Two countries, Brazil and Mexico, have the highest number of journals in the databases. As it could be expected, Brazil has more

journals in SciELO and Mexico has more journals in RedALyC. In general, the presence of both open access repositories is balanced among the Latin American and Caribbean countries.

SciELO has more journals in Argentina, Chile, Cuba, Peru, Portugal, and Uruguay, while RedALyC has more journals in Colombia, Costa Rica, Spain, and Venezuela. Bolivia and Paraguay only have journals in SciELO, while Dominican Republic, Ecuador, and Puerto Rico only have journals in RedALyC. Neither SciELO nor RedALyC have journals from Caribbean English-speaking countries such as Guadeloupe, Jamaica, and Trinidad and Tobago, which can be explained by the focus of these projects on Spanish and Portuguese publications. Among the Spanish-speaking countries, only El Salvador, Honduras, Nicaragua, and Panama do not have journals either in SciELO or in RedALyC.

The number of journals included in the regional projects SciELO and RedALyC could be explained through variables such country size, population, and science and technology indicators (no inferential analysis is performed in this manuscript). Countries with a lower scientific development have a smaller or none participation in the repositories. An interesting case for further study is Colombia. After Brazil and Mexico, this country has the largest number of journals in both SciELO and RedALyC. Colombia surpasses Brazil in RedALyC and Mexico in SciELO.

Data analysis by country from DOAJ shows that there are 18 Latin American and Caribbean countries out of the total of 111 countries represented in the database. After the United States, Brazil is the world's second top country regarding number of open access journals registered in DOAJ. Colombia (#12), Chile (#13), Mexico (#18), and Argentina (#19) are in the top 20 countries by number of journals in DOAJ. It is interesting again that Colombia is above Chile, Mexico and Argentina, countries that in 2008 had more articles published in journals indexed at the Thomson Reuters' Science Citation Index. Argentina had 7,618 articles, Mexico 9,637, Chile 4,251, and Colombia 2,184 (www.ricyt.org). Colombia has more journals in DOAJ than Japan and Australia. Chile is ahead of Mexico and Argentina as well. Regarding the Spanish-speaking countries that do not have journals in SciELO or RedALyC, only Nicaragua has a journal in DOAJ, while El Salvador, Honduras, and Panama do not have open access journals in this directory either. Only three non-Spanish-speaking countries from the Caribbean have journals in DOAJ: Bahamas (3), Barbados (1), and Jamaica (1).

Findings from the interviews

In general, open access publication has become an option and a must for most refereed journals in LA&C. The existence of the open access repositories SciELO and RedALyC is highly valued since journal editors, university authorities and government officers recognize they help publications from the region to be more visible. Visibility goes along with increased editorial and academic/scientific quality due to the strict criteria that journals must meet in order to be included in SciELO, RedALyC, and Latindex.

Most countries use OJS as the platform to develop the electronic versions of the journals. Since the main publishers in LA&C are academic units within universities, institutions in most cases provide servers for the publications using OJS and just a few have developed their own platforms.

Most journals have migrated from print-only publication to combined print and open access versions. Some have even eliminated print publishing and editors of some new journals tend also to consider only electronic publication. In some cases, for instance professional associations, it is still possible to maintain print versions when there is a captive audience (membership) among who is worth distributing hard copies. However, there are still a reduced number of editors who are reluctant to publish electronic journals or do not have yet access to the technology and the technical support needed for on-line open access publication. Authors like Odlyzko (1998) find that electronic publication could reduce publishing costs to a fourth; however, since most journals are published by academic institutions with reduced budgets, issues such as sustainability and archiving still have to be solved.

In some countries such as Brazil, Colombia, Mexico, and Venezuela, the existence of a national journal evaluation system has further contributed to increase the number and quality of journals. Some governments also provide funding for the top ranked journals (for instance, Brazil, Chile, and Venezuela).

The Colombian department of Science and Technology Colciencias developed in the early 1990s a bibliographic index called Publindex that establishes a journal ranking based, besides criteria of sustainability and scientific and publishing quality, on visibility. The latter is determined by the inclusion of journals in prestigious international indexes and percentage of articles and editorial board members from outside the publishing institution (exogamy). This has promoted a culture of excellence in journal publication that is also enhanced by other conditions

such as science and technology policy, university accreditation, and policies on faculty salaries from public and private universities.

The Venezuelan journal evaluation system assigns scores to journals and provides funding for inclusion in SciELO to the top ones (scores ≥60%). That system is currently in a kind of transition or limbo since public universities have opposed the current government policies and the government is trying to promote a Bolivarian model of higher education and to have scientific research aimed at the national needs; thus it is uncertain if funding from FONACIT and the Researcher Promotion Program (PPI) will stay as they currently are or will be modified.

Chile does not have a journal evaluation system but both national university ranking and research funding are based on performance (faculty with doctoral degrees, undergraduate enrollment, projects with national and international funding, and articles published in journals included in SciELO and/or the Thomson Reuters indexes –SCI, SSCI, AHCI, etc.-). Even though SciELO journals are recognized as the master list of the Chilean Commission for Science and Technology (CONICYT), it is at a disadvantage with Thomson Reuters since bonuses (money rewards given to institutions with articles published in indexed journals) to the former are less than a third to those given to articles from the latter. The Chilean government does not provide direct funding for journals but they can apply for competitive research grants.

Brazil has a system for evaluation and classification of journals from Brazilian graduate programs called Qualis/CAPES (Erdmann et al., 2009). In addition, the National Council for the Scientific and Technological Development (CNPq) and some state government agencies provide technical and financial support to Brazilian journals (Pessanha, 1999). Brazil's neighbor, Argentina, has a basic core of scientific journals that is managed by the Argentinean Center of Scientific and Technologic Information (CAICYT). This journal evaluation system has established a number of criteria but is less developed than the Brazilian, Colombian, or Venezuelan counterparts. In Mexico, Latindex does the main evaluation of journals. Smaller than the previous countries, Uruguay has been trying to reorganize its science and technology sector. SciELO Uruguay is a small chapter and is managed by a librarian from the Universidad de la República Hospital.

Most interviewees see open access as an alternative for institutions/libraries and scholars/researchers to the high costs of subscription to the most prestigious international

journals published by academic/professional associations and/or corporate publishers. Thus, it is essential to promote high-quality open access publications. Some also recognize and value that multinational publishers such as Elsevier (Scopus) and Thomson Reuters (Web of Science) are now more open to journals from developing countries, published in languages other than English, and using open access. There are even commercial publishers of journals considering including open access alternatives to their collections. This kind of movements is usually taken cautiously since there is always a profit interest behind not-for-free access to reliable knowledge. In addition, it is recognized that open access has made easier for LA&C journal editors to develop the networks necessary to increase exogamy, that is, receive manuscripts from external institutions and foreign countries, find peer-reviewers, and make up their editorial boards.

DISCUSSION

For the discussion, the Glonacal agency heuristic [analytical framework] (Margison & Rhoades, 2002) is used as a framework to develop the main argument in this manuscript: being a global trend that promotes the democratization of knowledge, open access has been key for the development of international, regional and national projects seeking to advance journal publication in LA&C. The Glonacal analyzes the dynamics existing between the global, national, and local levels. This study adapts that framework to include the regional level that in LA&C is very important, given the commonalities in the development of academic periodical publications.

Globally, the open access movement has gained some terrain in the realm of scholarly/scientific publication; however, higher education systems and scientific/professional associations from most advanced countries still have to fully accept it and give it the same value as mainstream journals that happen to be published and indexed mostly by corporate publishing companies. There are some international initiatives that use open access and originated in more advanced countries such as DOAJ from the Swedish Lund University Libraries, OpenDOAR from the British University of Nottingham, PKP-OJS from a consortium of universities from Canada and the United States (Simon Fraser, British Columbia, Stanford and Arizona State), and more closely to LA&C, Dialnet from Universidad de La Rioja in Spain. Certainly, LA&C has taken advantage of this opportunity to overcome limitations and challenges and to gain more academic and scientific presence internationally (Altbach, 2005; Bergeron, 1999; Borrego &

Cristobal, 2006; Buela-Casal et al., 2006; Delgado, 2010; Didriksson, 2008; Farga Medin et al., 2006; Holdom, 2005; Rama, 2006; Uribe, 2006; Utges, 2008; Vessuri, 2008; Willinsky, 2006).

At the regional level, several initiatives have also taken advantage of open access to create projects (directories, databases, repositories, and/or indexes) promoting the development of LA&C journals. The first one, Latindex, was created with the aim of making an inventory of LA&C journals (directory) and establishing criteria for high quality publications that are included in the index's catalogue. Latindex includes links to electronic journal websites most of which are open access. The Latindex criteria have been used by several governments to evaluate their own journals. The next two projects were created in the largest and most populated LA&C countries: RedALyC (Mexico) and SciELO (Brazil). Both are repositories of open access journals and bibliographic indexes; however, their origins are different. On the one side, RedALyC was created by a group of scholars from the School of Political and Social Sciences of the Autonomous University of the State of Mexico in Toluca, who were worried about the high costs of subscription and lack of access for Spanish authors and journals to mainstream publications and databases respectively. On the other side, SciELO was created by the Pan-American Health Organization Regional Library of Medicine (BIREME) in partnership with the State of Sao Paulo Foundation for the Support of Research (FAPesP) as a response to the obstacles for LA&C journals published in Spanish and Portuguese to the mainstream indexes, for instance, the Index Medicus (currently, Medline) of the National Library of Medicine of the United States.

The initial focus of RedALyC was publications in the social sciences and the target of SciELO was biomedical journals. However, early in the process leaders from both projects realized that they opened a window for all the journals in the region, regardless the subject or discipline. RedALyC has been a little bit more flexible than SciELO, which has allowed it to develop alliances and work in collaboration with institutions and other initiatives. For instance, RedALyC now includes the collection of the Latin American Council of Social Sciences CLACSO repository whose headquarters are located in Argentina. The author of the present manuscript considers that there is an emerging model of journal publication in LA&C and two of its distinctive characteristics are the open access emphasis of journal publication and the regional repositories/indexes such as Latindex, SciELO and RedALyC as a kind of spinal cord or unifying thread to the region's research/scholarly communication (Aguado et al., 2008; Cetto &

Alonso, 1999; Cetto et al., 2010; Flores et al., 2009; Meneghini & Packer, 2008; Packer et al., 2006; Packer & Meneghini, 2007; Packer, 2009).

Despite there is evidence of an emerging model of journal publication in LA&C, journals are not evolving evenly throughout the region. The model expresses mainly in those countries that have advanced more in the development of science and technology and higher education. It ranges from the creation, promotion or upgrade of government agencies (ministries, departments, councils) to the enactment of legislation and policy on higher education, and science, technology and innovation. Higher education systems are essential for the creation, communication and use of research and new knowledge by and for scholars/researchers, students, academic disciplines, and the society in general. The countries that are ahead in the publication of journals, at least in the number of publications expressed by their presence in the databases used in this study, are Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Mexico, Peru, and Venezuela. A second group consists of Bolivia, Ecuador, Uruguay, and Paraguay, countries that have a small presence in the repositories analyzed in this paper. Most countries from Central America and the Caribbean have a minimum or no evidence of taking advantage of open access to develop their own journals. It is important to notice that the three levels of countries mentioned here are more-or-less related to country population. It will be necessary to do more contextual and qualitative research to further understand what is happening in each country and by group of countries regarding journal publication.

In 2001, the Inter-American Development Bank published a paper authored by de Moura Castro et al. outlaying the Bank's strategy for the development of LA&C science and technology. According to the document, there are gaps within the region regarding scientific development; Argentina, Brazil, Chile, Mexico, and Venezuela made the most relatively advanced group. Colombia, Costa Rica, Uruguay, and the English-speaking Caribbean were a second group with more significant national capacity and specialized institutions to promote science and technology. The rest of the countries fared very poorly, in some cases with an absence of policies, institutions, and investments in national science and technology development. When comparing the de Moura Castro et al.'s paper with the findings of this manuscript regarding the presence of LA&C journals in open access repositories as an indicator, it is possible to notice some differences. Countries such as Colombia, Costa Rica, Cuba, and Peru seem to have progressed even beyond the more advanced countries in the region. That is the

case of Colombia. The rest of the countries have not apparently advanced much in publication of scholarly/scientific journals. As it was mentioned above, this kind of observation needs to be analyzed in the whole context of science and technology and higher education in the region and in each country to really determine the contribution of open access journals to the science and development in LA&C.

In conclusion, LA&C has a strong presence in international and regional repositories of open access journals, which increases the visibility of the region's publications and the possibility of developing academic networks. Regional directories like Latindex and repositories/indexes such as RedALyC and SciELO have had a major impact on the development of LA&C journals.

For further research, it would be important to evaluate the growth in quality and quantity of journals in the context of the science and technology and higher education sectors. In addition, it would be interesting to study the case of Colombian journals due to its particular growth in the publication of journals (Charum, 2004; Charum et al, 2002; CNHI et al, 2006; Colciencias, 2006; Delgado, 2011; Meyer et al, 1995). Colombian open access journals lead the regional indexes but journal articles by Colombian authors in mainstream journals are still behind colleagues from other LA&C countries. For instance, in 2008 Brazil had 31,903 articles in SCI journals, México had 9,637, Argentina 7,618, and Chile 4,261, while Colombia only had 2,184 (RICYT, 2011). It would be very interesting to study the dynamics of scholarly/research publication, network participation, and other science and technology factors in LA&C countries.

ACKNOWLEDGMENTS

This article is one of the products of three projects approved by the University of Pittsburgh Institutional Review Board (PRO10040119, PRO09020267, and PRO08030094). Funding for the trips to Chile, Colombia and Venezuela came from two scholarships from the University of Pittsburgh, the Nationality Rooms Iván Santa-Cruz Memorial Award and School of Education Alumni Association scholarship, as well as travel grants from the University of Pittsburgh Center for Latin American Studies and University Center of International Studies.

REFERENCES / REFERENCIAS

Aguado, E., Rogel, R., Gaduño, G., & Zuñiga, M. F. (2008, Nov.). Redalyc: una alternativa a las asimetrías en la distribución del conocimiento científico. *Ciencia, Docencia y Tecnología, XIX*(37), 11-30.

Aguirre-Bastos, C. & Gupta, M. P. (December, 2009). Science, technology and innovation policies in Latin America: Do they work? *Interciencia, 34*(12), 865-7

Alperín, J. P., Fischman, G., & Willinsky, J. (2008). Open access and scholarly publishing in Latin America: ten flavours and a few reflections. *Liinc em Revista, 4*(2), 172-85. Available from http://www.ibict.br/liinc

Altbach, P. G. (2005). Patterns of higher education development. In: P. G. Altbach, R. O. Berdahl & P. G. Gumport (editors). *American higher education in the twenty-first century. Social, political, and economic challenges*, 2nd edition, (pp. 16-37). Baltimore and London: Johns Hopkins UP.

Balán, Jorge. (2007). Higher education policy and the research university. In: Altbach, Philip & Jorge Balán (Editors). *World class worldwide: transforming research universities in Asia and Latin America*, (pp. 286-308). Baltimore: Johns Hopkins UP.

Bergeron, M. (1999). Internet: Una solución para las lenguas nacionales en ciencia. [Internet: A solution for national languages in science] In Cetto, Ana María & Alonso, Octavio (Comps.). *Revistas Científicas en América Latina – Scientific Journals in Latin America*. México: International Council of Scientific Unions, Universidad Nacional Autónoma de México, Consejo Nacional de Ciencia y Tecnología, Fondo de Cultura Económica.

Bernasconi, A. (2008, February). Is there a Latin American model of the University? *Comparative Education Review, 52*(1), 27-52.

Borrego, A., & Cristóbal, U. (2006). La evaluación de revistas científicas en ciencias sociales y humanidades. *Información, Cultura y Sociedad, 14*, 11-27.

Buela-Casal, G., Perakakis, P., Taylor, M., & Checa, P. (2006). Measuring internationality: Reflections and perspective on academic journals. *Scientometrics, 67*(1), 45-65.

Cetto, A. M., & Alonso, O. (Comps.) (1999). *Revistas Científicas en América Latina – Scientific Journals in Latin America*. México: International Council of Scientific Unions, Universidad Nacional Autónoma de México, Consejo Nacional de Ciencia y Tecnología, Fondo de Cultura Económica.

Cetto, A. M., Alonso-Gamboa, J. O., & Córdoba González, S. (2010). Ibero-American systems for the dissemination of scholarly journals: A contribution to public knowledge worldwide. *Scholarly and Research Communication, 1*(1), 1-16. Retrieved May 3, 2010, from http://www.src-online.ca/index.php/src/article/viewFile/17/31

Charum, J. (2004). La construcción de un sistema nacional de indexación, el caso de Publindex. *Convergencia, 11*(35), 293-309.

Charum, J.; Murcia, C.; Usgame, D. & Silva, A. (2002). *La Búsqueda de la Visibilidad a través de la Calidad: El Reto del Editor*. [The search for visibility through quality: A challenge for the editor] Calidad de la Educación Superior 2. Bogotá, Colombia: Instituto Colombiano para el fomento de la Educación Superior—ICFES.

Colciencias, Servicio Permanente de Indexación de Revistas CT+I Colombianas. (2006, August). Base bibliográfica nacional—BBN Publindex. Índice bibliográfico nacional Publindex—IBN Publindex. Bogotá, Colombia: Colciencias.

Consejo Nacional de Indexación y Homologación—CNHI, Colciencias, & Observatorio Colombiano de Ciencia y Tecnología—OCyT. (2006). *Servicios de indexación y resumen utilizados para los procesos de indexación y homologación de revistas de CT+I 2003-2006*. [Services of indexation and abstract used for indexation processes and validation of journals in CTI 2003-2006] Bogotá, Colombia: CNIH, Colciencias and OCyT.

de Moura Castro, C., Wolff, L., & Alic, J. (2001). *S&T for Development: An IDB strategy.* Washington: Inter-American Development Bank

Delgado, J. E. (2010). Trends in the publication of refereed journals in Spanish- and Portuguese-speaking Latin America, *Comparative & International Higher Education, 2*(2), 43-9. Retrieved from http://www.higheredsig.org/cihe/Number02-14.pdf

Delgado, J. E. (2011). Las revistas científicas en Colombia: logros, oportunidades y riesgos [Scientific journals in Colombia: achievements, opportunities, and risks]. *Unilibros de Colombia,* (18), 90-1.

Dialnet. Universidad de La Rioja, Fundación Dialnet. Retrieved on 04/23/2011, from http://dialnet.unirioja.es

Didriksson, A. (2008). Global and regional contexts of higher education in Latin America and the Caribbean. In: Gazzola, A. L., & A. Didriksson (editors). Trends in higher education in Latin America and the Caribbean, (pp. 20-50). Caracas: UNESCO IESALC.

Directory of Open Access Journals – DOAJ. Lund University Libraries. Retrieved on 04/23/2011, from http://www.doaj.org

Directory of Open Access Repositories – OpenDOAR. University of Nottingham. Retrieved on 04/23/2011, from http://www.opendoar.org

Erdmann, A., Marziale. M. H., Pedreira, M. L., Lana, F. C., Pigliuca, L. M., Padilha, M., & Fernandes, J. (2009, May-Jun). La evaluación de periódicos científicos Qualis y la producción brasileña de artículos del área de enfermería. *Revista Latino-Am Enfermagem, 17*(3). Retrieved from: http://www.eerp.usp.br/rlae

Farga Medin, C. A.; Bojo Canales, C., & Hernández Villegas, S. (2006, January-February). Pasado, presente y futuro del proyecto *SciELO* en España. [Past, present and future of the SciELO project in Spain] *El Profesional de la Información, 15*(1), 23-28.

Fischman, G. E., Alperín, J. P., & Willinsky, J. (2010). Visibility and quality in Spanish-language Latin American scholarly publishing. *Information Technologies & International Development, 6*(4), 1-21.

Flores, A. M., Penkova, S., & Román, A. (2009). Once años de LATINDEX: Una experiencia al servicio de las publicaciones científicas iberoamericanas. *Simbiosis, 6*(1), 1-27. Retrieved May 1, 2010, from http://egcti.upr.edu/images/stories2/artsp6109.pdf

Gómez, Y. J. (1999). A propósito de un ejercicio de evaluación de publicaciones seriadas científicas [About an exercise to evaluate scientific periodical publications]. In Cetto A. M., & O. Alonso (Comps.). *Revistas Científicas en América Latina – Scientific Journals in Latin America*. México: International Council of Scientific Unions, Universidad Nacional Autónoma de México, Consejo Nacional de Ciencia y Tecnología, Fondo de Cultura Económica.

Hedlund, T., Gustafsson, T., & Björk, B. C. (2004, July). The open access scientific journal: An empirical study. *Learned Publishing, 17*(3), 199-209.

Holdom, S. (2005). E-journal proliferation in emerging economies: The case of Latin America. *Library and Linguistic Computing, 20*(3), 351-365.

Landinelli, J. (2008). Scenarios of diversification, differentiation, and segmentation in Latin America and the Caribbean. In: Gazzola, A. L., & A. Didriksson (editors). *Trends in higher education in Latin America and the Caribbean,* (pp. 149-71). Caracas: UNESCO IESALC.

Lemarchand, G. A. (Editor) (2010). *Sistemas nacionales de ciencia, tecnología e innovación en América Latina y el Caribe [National Science, Technology and Innovation Systems in Latin*

America and the Caribbean]. Estudios y Documentos de Política Científica en ALC, vol. 1. Montevideo: UNESCO Oficina Regional de Ciencia para América Latina y el Caribe.

Margison, S., & Rhoades, G. (2002). Beyond national states, markets and systems of higher education: A glonacal agency heuristic. *Higher Education, 43*, 281-309

Meneghini, R., & Packer, A. L. (2008). Is there science beyond English? Initiatives to increase the quality and visibility of non-English publications might help to break down language barriers in scientific communication. *EMBO Reports, 8*(2), 112-6.

Meyer J. B., Charum, J., & Granjes, J. (1995, Sep). Is it opened or closed: Colombian science on the move. *Scientometrics, 34*(1), 73-86.

Odlyzko, A. (1998). The economics of electronic journals. *The Journal of Electronic Publishing, 4*(1). http://www.press.umich.edu/jep/04-01/odlyzko.html

Packer, A. (2009). The SciELO open access: A gold way from the South. *Canadian Journal of Higher Education, 39*(3), 111-26. Retrieved April 30, 2010, from http://ojs.library.ubc.ca/index.php/cjhe/article/view/479/pdf

Packer, A. L., & Meneghini, R. (2007). Learning to communicate science in developing countries. *Interciencia, 32*(9), retrieved April 30, 2010, from http://www.scielo.org.ve/scielo.php?script=sci_arttext&pid=S0378-18442007000900014&lng=es&nrm=iso

Packer, A. L., Prat, A. M., Luccisano, A., Montanari, F., Santos, S., Menghini, R. (2006). El modelo SciELO de publicación científica de calidad en acceso abierto. In: Babini, D., & J. Fraga. *CLACSO, Consejo Latinoamericano de Ciencias Sociales.* Buenos Aires: CLACSO. Available from http://bibliotecavirtual.clacso.org.ar/ar/libros/secret/babini/Parcker%20Part%20Lucisano.pdf

Pessanha, C. (1999). Las políticas de apoyo a las publicaciones científicas en Brasil. In Cetto, A. M., & O. Alonso. *Revistas Científicas en América Latina – Scientific Journals in Latin America*. México: International Council of Scientific Unions, Universidad Nacional Autónoma de México, Consejo Nacional de Ciencia y Tecnología, Fondo de Cultura Económica. 1999.

Pires, S., Lemaitre, M. J., Trindade, H., Trebino, H., & Ali, E. (2008). Higher education accreditation and assessment systems in Latin America and the Caribbean. In: Gazzola, A. L., & A. Didriksson. (Eds.). *Trends in higher education in Latin America and the Caribbean*, (pp. 287-305). Caracas: UNESCO IESALC.

Rama, Claudio. (2006). Los desafíos de las editoriales universitarias de América Latina en la sociedad del saber. [Challenges of Latin American university publishers in the knowledge society] In Claudio Rama, Richard Uribe, & Leandro de Sagastizábal. *Las editoriales universitarias en América Latina.* (pp. 11-23). Bogotá, Colombia: Instituto Internacional para la Educación Superior en América Latina y el Caribe –IESALC-, Centro Regional para el Fomento del Libro en América Latina y el Caribe –CERLALC-.

Red de Indicadores de Ciencia y Tecnología Iberoamericana e Interamericana (RICYT). (2007). *Estado de la ciencia [Status of science]*. Buenos Aires: RICYT. Retrieved August 03, 2008, from http://www.ricyt.org/index.php?option=com_content&view=article&id=158:el-estado-de-la-ciencia-2007&catid=6:publicaciones&Itemid=7

Red de Indicadores de Ciencia y Tecnología Iberoamericana e Interamericana (RICYT). (2010). *Bibliometric indicators*. Buenos Aires: RICYT. Retrieved April 23, 2011, from http://www.ricyt.org/index.php?option=com_content&view=article&id=150&Itemid=20

Samoilovich, D. (2008). Pathways to innovation. Re-thinking the government of public universities in Latin America. In: Gazzola, A. L., & A. Didriksson. (Eds.). *Trends in higher education in Latin America and the Caribbean*, (pp. 307-66). Caracas: UNESCO IESALC.

Scientific Electronic Library Online – SciELO. BIREME, Retrieved on 04/23/2011, from http://www.scielo.org

Sistema de información científica RedALyC. Red de revistas científicas de América Latina y el Caribe, España y Portugal. Universidad Autónoma del Estado de México. Retrieved on 04/23/2011, from http://www.redalyc.com

Sistema regional de información en línea para revistas científicas de América Latina, el Caribe, España y Portugal – Latindex. Universidad Nacional Autónoma de México. Retrieved on 04/23/2011, from http://www.latindex.unam.mx/documentos/docu.html

Steenkist, R. M.. (2008). *Open access: A chance to increase the academic publication in Latin American countries?* Unpublished master's thesis. Leiden, Netherlands: Leiden University.

Task Force on Higher Education and Society. (2000). *Higher Education in Developing Countries: Peril and Promise*. Washington DC: International Bank for Reconstruction and Development, the World Bank.

Torres, C. A., & Schugurensky, D. (2002). The political economy of higher education in the era of neoliberal globalization: Latin America in comparative perspective. *Higher Education, 43*, 429-55

Uribe, Richard. (2006). La edición de libros en las Universidades de América Latina y el Caribe, 2004). [*Publication of books in Latin America and the Caribbean, 2004*] In Claudio Rama, Richard Uribe, & Leandro de Sagastizábal. *Las editoriales universitarias en América Latina.* (pp. 11-23). Bogotá, Colombia: Instituto Internacional para la Educación Superior en América Latina y el Caribe –IESALC-, Centro Regional para el Fomento del Libro en América Latina y el Caribe –CERLALC-.

Utges, G. (2008). "Visibilidad, calidad y relevancia. Desafíos y oportunidades para nuestras revistas en tiempos de cambio. *Tecne, Episteme y Didaxis,* (Spec Issue), 35-46.

Vessuri, H. (2008). Overtaken by the future: foreseeable changes in science and technology. In: Gazzola, A. L., & A. Didriksson (editors). Trends in higher education in Latin America and the Caribbean, (pp. 51-81). Caracas: UNESCO IESALC.

Villanueva, E., Betancur, N., de Lacerda Peixoto, M. C., & Duriez González, M. (2008). Higher education reforms: 25 proposals for higher education in Latin America and the Caribbean. In: Gazzola, A. L., & A. Didriksson. (Eds.). *Trends in higher education in Latin America and the Caribbean*, (pp. 233-305). Caracas: UNESCO IESALC.

Willinsky, John. (2006). *The access principle. The case for open access to research and scholarship*. Cambridge, MA: Massachusetts Institute of Technology.

World Bank. (2002). *Constructing Knowledge Societies: New Challenges for Tertiary Education*. Washington DC: The International Bank for Reconstruction and Development, the World Bank.