# BIBLIOGRAPHIC CONTROL AND INTERNATIONAL VISIBILITY OF LATIN AMERICAN PERIODICAL PUBLICATIONS

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## ABSTRACT

Bibliometric research can provide science policy makers with indicators of the capacity of a country's national scientific system to produce printed information. The capacity of a scientific system to produce printed information, particularly periodical publications reflects the availability of local outlets for the dissemination of scientific findings. The availability, visibility and ease of access to outlets for the dissemination of scientific findings are factors of particular importance to science policy makers in developing countries (DC). These factors can reduce the insularity of the scientific output of a DC. The present research attempts to evaluate the level of bibliographic control, and the international visibility of the periodical publications of Latin American countries. A search was performed on the 1990 CD-ROM version of THE SERIALS DIRECTORY, a commercially produced international reference source on periodical publications. The periodical publication's output per Latin American country with the addition of Spain and Portugal was recorded. Publications were sorted thematically and indicators of bibliographic control, and of international visibility were recorded. Suggestions for the improvement of the international visibility and bibliographic control of periodicals from DC are presented.

## RESUME

*Les études bibliométriques sont en mesure de fournir aux décideurs politiques des indicateurs sur la capacité d'un système scientifique national à produire des informations imprimées. Cette capacité, et en particulier l'existence de publications périodiques, reflète l'existence locale de moyens de dissémination des résultats de la recherche. La facilité d'accès, La disponibilité et la visibilité de ces moyens de dissémination sont des facteurs d'une importance particulière pour les décideurs politiques dans les pays en développement (PED). Ces facteurs peuvent réduire l'insularité de la production scientifique d'un PED.*
*Le présent travail a pour but d'évaluer le niveau de contrôle bibliographique, et la visibilité internationale de publications périodiques Latino Américaines. Une recherche a été effectuée à partir de la version CD-ROM d'un répertoire (THE SERIALS DIRECTORY), source internationale de référence sur les publications*

*périodiques. Nous avons enregistré la production de publications périodiques par pays Latino Américain ainsi que pour l'Espagne et le Portugal. Nous avons trié les publications par thème et nous avons produit des indicateurs de contrôle bibliographique et de visibilité internationale. Nous proposons en conclusion des suggestions pour améliorer la visibilité internationale et le contrôle bibliographique des périodiques des PED.*

## INTRODUCTION

Bibliometric research can provide science policy makers with indicators of the capacity of a country to produce printed information. Printed information can take the form of monographs, journals, conference proceedings and "grey literature". Each of these media fulfills a specific role in the communication of scientific results. The availability of publication media indicates the level of maturity of the indigenous publishing industry. A mature publishing infrastructure provides sufficient local outlets for scientists to disseminate findings about locally produced research.

The traditional outlet for the dissemination of research results in the sciences and social sciences is the scientific journal. However, its role as primary element in the diffusion and exchange of scientific ideas has been seriously contested in favour of a perspective that links publication practices with the present evaluation and reward systems of science (1). Indeed, since the evaluation of scientific work can be influenced to some extent by the visibility and reputation of the journals in which the work is published, the choice of highly visible, prestigious scientific journals as publication outlets has become a crucial element in the career of scientists (2).

The choice of publication outlet affects not only the visibility and recognition of the work of a scientist as an individual, but also plays a role in the visibility and recognition of the efforts of any country as a contributor to scientific knowledge. The publishing infrastructure of any country plays a key role in introducing and making available journals which publish the results of local science.

The mechanisms by which scientific journals become academically recognized, visible and commercially viable ventures are worth considering. However, the role of the publishing industry as an intermediary in the dissemination and visibility of scientific journals has not so far been presently researched in the area of scientometrics (3).

The present paper examines the effect of the publisher in the visibility of the periodical publications of a group of developing countries, DC in Iberoamerica. The concepts of international visibility, bibliographic control and academic recognition shall be discussed from the viewpoint of a mature publishing infrastructure in the first section of this paper. This viewpoint shall be contrasted to the problems of publishing in developing countries in section 1.3. The

database selected for the study shall be described in the second section. The methodology for sample selection is presented in the third section, the results are presented in the fourth section, and finally a discussion of the findings and their implications to future research in bibliographic control is presented in the last section.

## 1.1. VISIBILITY OF PERIODICAL PUBLICATIONS

The concept of visibility implies the state or fact of being visible. For the purposes of this research a periodical publication becomes "visible" the moment it can be uniquely identified and obtained by its potential readers.

The visibility of scientific journals can be seen as the result of a composite process involving objective and subjective elements. A traceable bibliographic record per scientific journal constitutes a countable item which can be used to produce bibliographies. In turn, the bibliographies can be analyzed to picture the publication structure of individual scientists or the total yearly publication output of a research group or field. In as much as the bibliographic records are countable, they present an objective picture of research output.

The subjective element involves the evaluation of the intrinsic value of the information published in the journal. This academic recognition is usually related to the existence of an internationally recognized editorial board, and an enforceable peer review processes. Both objective and subjective elements shall be further examined in the next two sections.

## 1.2. BIBLIOGRAPHIC PRODUCTION AND CONTROL

The bibliographic production of periodical publications of a country has been related to the number of items listed in periodically updated reference sources (4). Bibliographic control over serials is achieved in the sense that every item in the national bibliographic production satisfies the following criteria:

- every item is uniquely described
- every item can be traced back by its publisher
- every item can be easily obtained

The unique description of a journal deals with the normalized application of standard bibliographic elements to produce a standard bibliographic record that will facilitate its physical description and its access. Examples of such bibliographic elements are: the title of a journal, its ISSN number, its country of publication, its frequency, its publisher etc. These elements have been traditionally used by libraries to produce cataloguing cards. These elements also have been used by commercial database producers to produce computer searchable automated cataloguing records which can be accessed on-line. In either case the purpose of the bibliographic record is the same, to accurately

describe the document in question, and to provide the information necessary for the user to access the document.

A traceable bibliographic control record therefore implies that the publication must have the elements that insure its unique identification, both for descriptive purposes (library catalogues), and for acquisition purposes (subscriptions by institutions or individuals). Publishers usually insure at publication time that the publication's name, editor, publisher, publisher's address, ISSN and country of publication appear. Subsequently, the title is uniquely identified and can be listed in national and international reference sources compiled either by national libraries or commercial institutions.

The ease of availability of a document is therefore related to having its bibliographic record listed in a frequently updated reference source, and to its subsequent mention in printed or on-line versions of major library catalogues and secondary publication data bases. The existence of major bibliographic reference sources such as the National Union Catalogue, the OCLC cataloguing network or the catalogues of The British Library allow for virtually any document produced in industrially developed countries to be obtained with relative ease.

## 1.3. ACADEMIC RECOGNITION AND COMMERCIAL SUCCESS OF PERIODICAL PUBLICATIONS

The academic recognition of a periodical publication often reflects a subtle interaction between the communication needs of the scientific community, the academic motivation of the editor and its editorial board, and the economic motivation of its publisher. Ideally, all of these motivations coincide to produce a journal that prints academically sound information, that is accepted and recognized by the scientific community it serves, and that is a commercial success.

Since the academic recognition of a journal is a complex mechanism that involves at least the constant interaction of three different groups of people with different motivations, it is important to understand the mechanisms leading to a successful publication both from an academic and an economic perspective. In an academic perspective a journal is the result of the choices of scientists who wish to communicate their research results and to stake a claim of their contribution to knowledge by submitting manuscripts for review to the editorial board of a journal. The members of the editorial board, scientists themselves, act as regulators of self-imposed research standards in the academic community, and make sure that manuscripts get assessed according to the rules of the community. The scientist and the members of the editorial board are both members of the scientific community at large and their aims for publishing are presumably non-commercial.

The publisher on the other hand, is usually a financial investor. Publishing scientific literature is seen as a business enterprise where an adequate return for the original investment is sought. Since an economic return is expected and an

investment is at stake, publishers often coordinate and orchestrate the different actors involved in the establishment of a journal in order to ensure as much as possible its financial success. Major science publishers aim to produce quality journals from an academic and a production and distribution perspective.

Major science publishers recognize that quality journals are the result of several factors:

- the need by the scientific community for a new journal
- a good editorial board
- a solid production infrastructure
- sound marketing principles

Considerable research efforts are spent by science publishers on the identification of suitable areas for the launching of a scientific journal (5). The research may include the analysis of the yearly number of conferences on research-front topics, the number of academic societies per topic, and in many cases, the number of yearly post-graduates in the discipline. Ideally, the journal has to attract at least 1 years' worth of manuscripts prior to the publication of the first issue (6) and can continue to attract a substantial number of manuscripts to maintain its publication schedule.

A respectable academic record is achieved by a knowledgeable impartial editorial board to examine the academic content of submitted manuscripts. In fact, major efforts are spent by publishers in locating potential editorial board members that can guarantee academic quality and that can attract by virtue of their reputation sufficient manuscripts to keep the journal viable as an academic and a commercial venture.

A solid production infrastructure is particularly important in the initial stages where the attractiveness and printing quality of the journal will be judged. Although the quality of the information in the journal is the paramount factor to subscribers, consideration is given by the publisher to deliver the information in a durable, attractive package. Issues such as the printing quality, the accurateness of the delivery of the journal, the timeliness of its printing, and the quality of the paper give the periodical an attractive image. Sophisticated science publishers are aware of these considerations and therefore make financial investments in the technical equipment necessary to produce quality printing.

Finally, circulation forecasting figures based on readership levels derived from market research are drawn by publishers wishing to asses the prospective rate of return on their investment. These figures complement feasibility plans with detailed costs of managing, producing, editing, printing, distributing and marketing the journal. The feasibility plans are important because publishers are usually aware that on average a possible return on their investment will not occur before the journal reaches five years (7).

### 1.4. BIBLIOGRAPHIC PRODUCTION, CONTROL & VISIBILITY

The picture described in the preceding two sections is drastically different, however, in most DC where sources of bibliographic control are generally non-existent or exist only in legislative form with depository libraries lacking resources to maintain up-to-date catalogues of the country's bibliographic production (8).

Estimates of bibliographic production are therefore based on counts of items listed in printers' catalogues or publishers' lists. The shortcoming of this method is that the estimate will be as reliable as the lists are exhaustive, and frequently updated. Some form of bibliographic control and some local visibility can be achieved by word of mouth, or by developing personal knowledge of the particularities of a library collection compared with other collections, however this form of control is highly individualized and cannot be assessed and measured to produce a picture of the degree of control the country has over its bibliographic production.

## 2. BIBLIOGRAPHIC CONTROL AND THE SERIALS DIRECTORY

Librarians have long aimed to achieve bibliographic control of their collections, particularly with the advent of automated retrieval bases and the possibilities of interchanging machine readable records of holdings. Bibliographic control of serials is a complex issue because the publishing world of serials is a very dynamic one. Periodical publications emerge as invisible colleges become institutionalized; the scope of a journal may change to reflect a change of membership of the editorial boards; titles die; titles merge etc.

Librarians are increasingly making use of commercially produced reference sources of bibliographic information to keep them abreast of the bibliographic changes in the world of serials. One such reference source is THE SERIALS DIRECTORY produced by EBSCO.

EBSCO, as a multinational subscription agent is an intermediate between editors and publishers of serials, and libraries. It confronts problems of bibliographic control of a much greater magnitude than most libraries since it aims to provide any library in the world with any serial publication in existence regardless of its country of publication.

In order to serve its clients EBSCO maintains an on-line database called EBSCONET that records bibliographic and price information on over 300,000 titles. As a large database, EBSCONET experiences an average of 10,000 changes per month (9). The composition of the database is international and it reflects to a certain extent the acquisition policies of EBSCO's clients. Any EBSCO client worldwide can access the database through telecommunication networks such as Tymnet and Alanet. A subproduct of EBSCONET has been

made commercially available in CD-ROM and book format since 1986 as THE SERIALS DIRECTORY.

This reference source is now in its 5th edition and comprises information on over 150,000 titles produced by 51,000 publishers worldwide. This involves amongst other things the yearly mailing of over 200,000 questionnaires in 5 languages to publishers and editors of serials worldwide.

In addition to the mailing to editors and publishers, THE SERIALS DIRECTORY incorporates bibliographic information from the CONSER Snapshot, Library of Congress, including the MARC-S and the unauthenticated CONSER Updates.

THE SERIALS DIRECTORY is therefore built from three sources, the EBSCONET database provides current subscription information such as the frequency of a title, its price, the name of its publishers and its address and telephone number. The mailings to the publishers are used to verify and corroborate the accuracy of the subscription information as well as to furnish additional information regarding the scope of the journal, its acceptance of book reviews and advertising, its circulation figures, and a descriptive listing of the publication. Finally the CONSER records provide the bibliographic information concerning the title statement, the key title, the dates of publication, the ISSN, the country of publication, the language(s), index and cumulative index availability, and several other bibliographic elements (10).

## 3. METHODOLOGY

The purpose of this research was to examine the visibility of Iberoamerican serials in THE SERIALS DIRECTORY through indicators of bibliographic control. A computerized search of the database was performed on the CD-ROM disc corresponding to Summer 1990. Iberoamerican publications were selected using their corresponding country codes (11). The search yielded a total of 5,167 publications. Spanish and Portuguese publications were included in the search and merged into the initial result list. This decision was taken because of the major cultural influence of both countries in Latin America and the similarity of problems faced by the publishing sectors of all countries involved.

The 5,167 publications were then grouped into 7 thematic categories. The categories were based on the list of Subject Headings provided in THE SERIALS DIRECTORY. The results of each individual search merged into 7 large thematic categories listed in Table 1.

It was not possible to include the remaining 1798 periodicals as they fell outside the 7 categories contemplated.

Table 1. Iberoamerican publications

| Thematic Groups | Number | % |
|---|---|---|
| Social Sciences | 939 | 28 |
| Arts and Humanities | 862 | 26 |
| Sciences | 487 | 14 |
| Agricultural Sciences | 353 | 10 |
| Engineering | 284 | 8 |
| Health Sciences | 272 | 8 |
| General Interest | 172 | 5 |
| Total | 3369 | 99 |

As a comparison point a search on the periodical production of the rest of the world was performed on the same subject categories as those studied in Iberoamerica. The results are presented in Table 2.

Table 2. Geographic ans thematic distribution of periodicals publications

| Geographic groups | Iberoamerica | | World | |
|---|---|---|---|---|
| Thematic groups | N | % | N | % |
| Social Sciences | 939 | 28 | 18811 | 24 |
| Arts and Humanities | 862 | 26 | 13912 | 18 |
| Sciences | 487 | 14 | 12638 | 16 |
| Agricultural Sciences | 353 | 10 | 6347 | 8 |
| Engineering | 284 | 8 | 12405 | 16 |
| Health Sciences | 272 | 8 | 6019 | 8 |
| General Interest | 172 | 5 | 6019 | 10 |
| Total | 3369 | 99 | 78630 | 100 |

It is interesting to note that in spite of the huge differences in actual numbers between the world production of periodicals and those of Iberoamerica, there was very little difference in the percentages except for the case of Engineering, where the world's production (16%) contrasts to that of Iberoamerica (8%).

## 3. INDICATORS OF VISIBILITY

In order to examine the visibility of periodical publications it was necessary to detect bibliographic elements that would ensure that a publication could be easily identified and bought in its country of origin, as well as abroad. An examination of the standard descriptive entries for a periodical publication in The Serials Directory revealed up to 24 items of information, listed in Table 3. The elements

marked with an asterisk were those selected for their influence on the visibility of a journal. Although strictly speaking the title is one of the most important bibliographic element in a publication this element was ignored in the present study because very little visibility can be derived from the title of a periodical.

The ISSN was selected as a visibility indicator on the understanding that the ISSN allows for a publication to be uniquely identified and makes it more easily traced back to its publisher. ISSN numbers are assigned under the auspices of the ISDS network. The International Serials Database System, ISDS network was formed in 1971 by the United Nations. It operates in France and is divided into member countries that work from national centres. Each national centre is responsible for assigning an ISSN to each serial published in its country while adhering to the ISDS standards.

Table 3. Standard description. Serials Directory

| | | |
|---|---|---|
| (1) Subject | (9) Frequency | (17) CODEN |
| (2) Key Title | (10) Price | (18) Book Review |
| (3) Title | (11) Publisher * | (19) Advertise |
| (4) Date/Volume | (12) Index/Abstracts | (20) Circulation * |
| (5) ISSN * | (13) Telephone | (21) Index Availability * |
| (6) Serial Type | (14) Editor * | (22) Description (Scope) * |
| (7) Country | (15) Classifications (NLM, DC, LC, UDC) | (23) Other Formats |
| (8) Languages (s) * | (16) CONSER | (24) Preceding Title |

The Language field was selected as an indicator because multilingual journals, or publications that systematically include abstracts in English, or other languages have more probabilities of being incorporated into major secondary publications and databases. Similarly, the existence of an Index either by Author, Title or Subject simplifies the retrieval of the articles within the journals. This in turn facilitates the journal's entry into major international indexing and abstracting services. The Index/Abstract field was selected because once a publication is selected to be systematically perused for indexing and abstracting purposes by an international abstracting service its eventual visibility and possible commercial success is ensured.

The Editor field was selected since the editor is responsible for the academic integrity of the journal. The existence of an editor generally implies the existence of an editorial board and of a peer review process. All of the above constitute requirements ensuring the academic quality of the publication, and preconditions to the insertion of the journal into to an abstracting service. The Description of Scope was selected because it provides a small section in which the editor describes the scope and general contents of the journal.

The Publisher field was selected because it was felt that its role was crucial to the survival, commercial success and eventual visibility of any periodical publication. Similarly, the Circulation field was selected because it might be an indicator of the commercial success of the periodical and of its ultimate visibility.

## 4. RESULTS

The analysis of the data pertaining to the availability of bibliographic items in the periodical publications of DC gives evidence of a very loose level of bibliographic control. Indeed, the data pertaining to the number of journals that listed an ISSN number (Table 4) show that only 45% (124) of the 277 journals studied, listed this most important item of bibliographic identification and control. Similarly, only 11% (30) of the journals reported the printing of a periodic index, (Table 5), thus making the retrieval of a particular article within the journal an extremely cumbersome process.

The academic quality of the journals was also in doubt since only 20% of the journals (55) listed an editor or an editorial board (Table 6). The absence of an editor responsible for the academic integrity of the journal as an enforcer of editorial practices, and an overseer of the peer review process reveals a major shortcoming of the publisher. It is possible that there is indeed a person responsible for these important academic activities, and it was simply not reported by the publisher. Nonetheless the frequent omission of a named editor is disturbing.

Similarly, only 22% (61) of the journals presented a description of scope (Table 7). This data is consistent with the data presented in the preceding table in which very few editors were listed, since the description of scope field is the place where the editors or the editorial board, describe the aims of the journal as well as its scope.

Table 4. Distribution of Journals with ISSN

| Subject | Arts | Sci. | Eng. | Gen. | Med. | Agric. | Total | % |
|---|---|---|---|---|---|---|---|---|
| Yes | 32 | 19 | 18 | 8 | 24 | 23 | 124 | 45 |
| No | 31 | 27 | 25 | 31 | 14 | 25 | 153 | 55 |
| Total | 63 | 46 | 43 | 39 | 38 | 48 | 277 | 100 |

Table 5. Distribution of journals with an index

| Subject | Arts | Sci. | Eng. | Gen. | Med. | Agric. | Total | % |
|---|---|---|---|---|---|---|---|---|
| Yes | 7 | 3 | 3 | 4 | 5 | 9 | 30 | 11 |
| No | 56 | 43 | 40 | 36 | 33 | 39 | 247 | 89 |
| Total | 63 | 46 | 43 | 39 | 38 | 48 | 277 | 100 |

Table 6. Distribution of Journals with listed editors

| Subject | Arts | Sci. | Eng. | Gen. | Med. | Agric. | Total | % |
|---|---|---|---|---|---|---|---|---|
| Yes | 11 | 5 | 7 | 9 | 12 | 11 | 55 | 20 |
| No | 52 | 41 | 36 | 30 | 26 | 37 | 222 | 80 |
| Total | 63 | 46 | 43 | 39 | 38 | 48 | 277 | 100 |

Table 7. Distribution of journals with a description of scope

| Subject | Arts | Sci. | Eng. | Gen. | Med. | Agric. | Total | % |
|---|---|---|---|---|---|---|---|---|
| Yes | 10 | 6 | 8 | 13 | 12 | 12 | 61 | 22 |
| No | 53 | 40 | 35 | 26 | 26 | 36 | 216 | 78 |
| Total | 63 | 46 | 43 | 39 | 38 | 48 | 277 | 100 |

A breakdown into three categories was performed on the Publishers field in order to have a clearer picture of the bodies responsible for the production of periodical publications in Iberoamerica. The breakdown is presented in Table 8 where the major publisher of periodical publications was the academic sector, comprising 34% (95) of the journals in the sample. As a whole the distribution of publisher types is quite even, with commercial publisher providing 32% (89) of the journals.

Table 8 . Publishers type per subject category

| Publ. Type * | Arts | Sci. | Eng. | Gen. | Med. | Agric. | Total | % |
|---|---|---|---|---|---|---|---|---|
| A | 34 | 15 | 8 | 6 | 11 | 21 | 95 | 34 |
| G | 8 | 13 | 13 | 5 | 6 | 23 | 68 | 25 |
| C | 17 | 4 | 20 | 27 | 19 | 2 | 89 | 32 |
| N.A. | 4 | 14 | 2 | 1 | 2 | 2 | 25 | 9 |
| Total | 63 | 46 | 43 | 38 | 38 | 48 | 277 | 100 |

*Legend - Publisher Type*. A = Academic Publishers; G = Governmental Publishers; C = Commercial Publishers; N.A.= Non Available

An analysis of the data pertaining to the availability of multilingual periodicals produced in DC shows that only 20% (56) of the journals are either published in more than 1 language or with abstracts in more than 1 language (Table 9). This seems to suggest that the publishers aim towards a local readership, or towards an almost exclusively Spanish-speaking audience.

The circulation data presented in Table 10 shows that circulation data was only available for a quarter of the data. This suggests that publishers did not want to

have their circulation data disclosed. For the available data only 8% (23) of the journals achieve a circulation figure between 1000-2999. The breakdown figure is admittedly arbitrary, but it does show that the readership is not extensive.

Table 9. Number of languages used per journal

| Lang. used | Arts | Sci. | Eng | Gen. | Med. | Agric. | Total | % |
|---|---|---|---|---|---|---|---|---|
| 1 | 53 | 36 | 36 | 36 | 26 | 34 | 221 | 80 |
| 2 | 4 | 5 | 5 | 3 | 9 | 10 | 35 | 13 |
| >3 | 6 | 5 | 2 | 1 | 3 | 4 | 21 | 7 |
| Total | 63 | 46 | 43 | 39 | 38 | 48 | 277 | 100 |

Table 10. Circulation data

| N | Arts | Sci. | Eng. | Gen. | Med. | Agric. | Total | % |
|---|---|---|---|---|---|---|---|---|
| -999 | 5 | 5 | 2 | 0 | 0 | 7 | 19 | 7 |
| 1000-2999 | 3 | 4 | 2 | 7 | 3 | 4 | 23 | 8 |
| 3000-4000 | 2 | 1 | 1 | 1 | 3 | 2 | 10 | 4 |
| > 5000 * | 1 | 0 | 3 | 8 | 7 | 0 | 19 | 7 |
| N.A. | 52 | 36 | 35 | 23 | 25 | 35 | 206 | 74 |
| Total | 63 | 46 | 43 | 39 | 38 | 48 | 277 | 100 |

* Journal with Largest Circulation = 36,000

Consistent with the data that suggest only local readership levels, only 20% (84) of the publications are systematically perused and indexed by international secondary publications (Table 11). The data agrees quite well with the data presented in Table 9 where 80% of the journals were published in only 1 language. Due to the fact that most major international indexing and abstracting services are English language based, the publication of only Spanish language abstracts seriously affects the inclusion of Iberoamerican publications into these services.

Table 11. Number of journals retrieved by indexing / abstracting services

| | Arts | Sci. | Eng | Gen. | Med. | Agric. | Total | % |
|---|---|---|---|---|---|---|---|---|
| 0 | 47 | 30 | 28 | 36 | 19 | 33 | 193 | 70 |
| 1-3 | 10 | 10 | 9 | 0 | 10 | 6 | 45 | 16 |
| > 3 | 6 | 6 | 6 | 3 | 9 | 9 | 39 | 14 |
| Total | 63 | 46 | 43 | 39 | 38 | 48 | 277 | 100 |

In order to examine the role of the publisher in the production of journals, four of the visibility indices studied in the preceding section were compared with the respective type of publisher. The results are presented in Table 12.

Table 12. Indicator vs. publisher type

| Pub. Type Indicator | Academic % | Government % | Commercial % | N.A. % |
|---|---|---|---|---|
| No Editor | 71 | 94 | 74 | 100 |
| 1 Language | 67 | 87 | 85 | 88 |
| No Index | 83 | 94 | 89 | 100 |
| No ISSN | 35 | 68 | 64 | 68 |

Academic publishers constitute the largest publisher type in the sample studied, although admittedly the distribution of journals amongst publisher type is quite even. Academic publishers are responsible for 34% (95) of the journals studied, see Table 8. However, 71% of those editors printed periodicals without a named editor. Likewise, 83% of the academic editors printed journals without an index at the end of the volume. Commercial publishers are the second largest publisher type. They are responsible for 32% (89) of the journals studied, see Table 8. In this case 74% of the publications were produced without editor and 89% without an index. Governmental publishers produced 25% (68) of the journals in the sample. However, 94% of their publications were without an editor, and without an index.

In the case of the introduction of ISSN numbers, the community of academic publishers fared the best, only allowing 35% of its production to be without an ISSN. However commercial and governmental publishers allowed over 60% of their production to be without the ISSN in spite of considerable efforts to improve the bibliographic control of DC through the International Serials Database System, ISDS.

The conclusions derived from the data presented in this section are somewhat limited because comparable data on the bibliographic control of publications from industrially developed countries was not obtained due to financial constraints.

## 5. DISCUSSION

Journals with high visibility are seemingly published in countries where the scientific and publishing infrastructure is mature (12). The visibility and international recognition of these publications is the result of numerous factors such as a stringent editorial practice, the visibility and internationality of their editorial board, the commercial savvy of the publisher and the application of

publishing standards that facilitate an adequate bibliographic retrieval and control of the journal.

On the basis of the data analyzed in the preceding section, the publication infrastructure of the Iberoamerican countries studied is still in a developmental stage. Publications issued from this infrastructure do not present the minimum levels of bibliographic control necessary to be uniquely identified, read, and subscribed to by an international audience. Periodical publications issued from such an infrastructure are condemned to a ghost-like existence, and the scientists that publish in them are condemned by implication to have their research results unrecognized (13). Both of these factors have grave implications from a science policy perspective in DC.

An immature publishing infrastructure means that there are relatively no valid publication opportunities available locally. In this case, science policy planners can decide to favour either a national or an international publication strategy for their scientists. Both approaches have advantages and disadvantages.

An approach that favours only international publications implies that researchers will not be induced to publish locally. Scientists must publish abroad and adhere to international reviewing and publishing standards. To publish abroad entails a number of choices by scientists working in DC as to the types of problems to be researched, the methodologies to be employed, and the type of outlet in which to present the results (14). These choices have significant repercussions on the scientist's career, and the type of rewards offered by the peer community. Therefore there may be some conflict between the interests of individual scientists and those of DC. To choose to participate in "front-line" science will almost inevitably mean the adoption of scientific problems suited to the prevailing problems and conditions of developed nations. These might not suit the scientific and technological needs of developing countries.

On the other hand, Arvanitis and Chatelin (15) argue in favour of an integrated science policy concerning publication of research results favouring national publications, coupled with increasing interaction and participation of DC in international congresses. The implementation of such a strategy would allow local publications to establish and develop a local scientific press with progressively more sophisticated editorial and refereeing practices. Local journals would develop an indigenous readership base composed of researchers and students. As the publishing and editorial standards improved such a policy would allow scientists and journals from DC to become more visible internationally.

## CONCLUSIONS AND RECOMMENDATIONS

The development of a local publishing infrastructure is a long-term investment. Science policy makers can decide to favour financially those publishers that incorporate the bibliographic control elements recommended by the ISDS, and necessary for the unique identification of their journals. Training

schemes with successful science publishers can be arranged, and promotional activities of specific journals vis a vis major indexing and abstracting services can be done.

Certain policies, such as the refusal of mailing privileges at advantageous rates could be implemented to discourage publishers that do not adhere to ISDS norms. However, a commitment towards bibliographic control takes more than mere adherence to ISDS norms for political impact.

The participation of a country in international bibliographic networks like the ISDS, working towards the common goal of universal bibliographic control means an array of hidden costs not always fully realized at the outset of the cooperation agreement. More often than not the agreement is done for political reasons without adequate financial and man-power support for full participation. Science policy makers have to realize that a strong publishing infrastructure producing timely documents such as scientific periodicals, directories of scientists, scientific societies, and research institutions is vital in DC. A consequence of a lack of reference/information sources is a diffuse and often imprecise picture of the scientific system. Science policy makers shall continue to make decisions in situations of extreme uncertainty, until adequate information to facilitate decision making about the scientific system becomes available.

## Bibliography and Notes

(1) Garvey and Griffith, B.C. Informal channels of Communication in the Behavioural Sciences: their relevance in the Structuring of formal or Bibliographic Control. IN Foundation of Access to Knowledge, a Symposium. Syracuse: Syracuse University Press, 1968.

(2) The publication of research results in scientific journals is presently interpreted as the end product of research in a final and public form, and the nature of the information contained in the scientific journal is both formal and repository. Nonetheless, scientists continue to submit manuscripts for publications although their motivation might be more linked to the present reward systems of competitive science than to the desire for communication. For more information on this see Ravetz, J. R. Scientific Knowledge and its Social Problems, Oxford: Clarendon Press, 1971. 282.

(3) The problems of the publishing industry in DCs has been explored in the field of library and information science. See Mlaki, T. Serials of the Poor Nations: their Nature, Importance, Problems and Suggested Solutions. International Cataloguing:14:4:39-41:1985, or Dougherty, R. The State of Professional Publishing in Non-Industrialized Nations. Ifla Journal 8:3:273-277:1982.

(4) Martyn, J. Proliferation and Fragmentation of Journals. IN The Scientific Journal, edited by A.J. Meadows. London, ASLIB, 1979, 68-70.

(5) Personal Communication. A. Jongejaan, Confidential Report, Elsevier, 1990.

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(8) Line, M. National Libraries in a Time of Change. Ifla Journal 14:1:20-28:1988.
(9) Vanderpoorten, M. The Effect of Automation on Subscription Agency Services. The Serials Librarian 14:3/4:49-54:1988.
(10) Carmichael, E. and Weed, J. The Birth of a New Serials Database. The Serials Librarian 14:3/4:113-119:1988.
(11) The countries included were: Argentina, Brazil, Bolivia, Colombia, Chile, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Peru, Panama, Portugal, Puerto Rico, Paraguay, Spain, Uruguay and Venezuela.
(12) The total number of publications in science and technollogy is difficult to assess due to the fact that not all publications have a retrievable bibliographic record. Research in this area has usually counted the items listed in large libraries, for examples, see Carpenter, M. and Narin, F. The Subject composition of the Worlds Scientific Journals. Scientometrics 2:1:53-63:1980.
(13) Spagnolo, F. Brazilian Scientists' Publications and Mainstream Science: Some Policy Implications. Scientometrics 18:3-4:1990.
(14) This policy goes against the development of local invisible colleges as it thwarts their own publication outlets, see Vessuri, H. 1986. "La Publicacion Cientifica Latinoamericana como Vehiculo de Fortalecimiento de la Capacidad Cientifica Regional." Mimeo. 32p.
(15) Arvanitis, R. and Chatelin, Y. National Scientific Strategies in Tropical Soil Sciences. Social Studies of Science 18(1):113-46:1988.