

Small Scientific Journals from Small Countries: Breaking from a Vicious Circle of Inadequacy

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In this editorial we describe the confounding factors that contribute to the poor international recognition of small journals: author pool, review process, finances, language, and visibility. These factors originate from relative scientific inadequacy of the local environment and close a positive feedback loop (vicious circle) of journal inadequacy. We argue that small journals may provide important information and outline the ways in which they can be assisted.

Key words: Croatia; electronic publishing; indexing; Internet; journals; medical education; peer review; periodicals; publishing

The *Croatian Medical Journal* (CMJ) closes this year with another major achievement – inclusion in the indexing databases of the Institute for Scientific Information (ISI) – Current Contents/Clinical Medicine, SCI-Search (Web of Science), and ISI Alerting Services. With this accomplishment CMJ joins five other Croatian journals already indexed in such selective databases and becomes the first medical journal from Croatia (out of more than 40 regularly published biomedical scientific journals) in the Current Contents database.

What does it mean for a small journal to be included in the major indexing databases, such as Current Contents of the ISI and MEDLINE of the National Library of Medicine? Why do small journals strive so hard to get included and yet most of them do not get accepted, so their visibility in the scientific world remains low? What are the confounding factors that contribute to this poor visibility? We shall address these questions from a general philosophical and social point of view, and present our experience in reaching out of the vicious circle of the scientific periphery.

Scientific journals are the major medium of exchange and dissemination of scientific information (1). The number of publications presenting the results of scientific research is enormous and may increase even more with new developments in the electronic media (2). For the field of medicine and related biomedical sciences, the US National Library of Medicine receives more than 20,000 journals and indexes almost 4,000 in its bibliographic database, MEDLINE (3). The Sci-

ence Citation Index (SCI), the bibliographical database of the ISI (Philadelphia, PA, USA), covers approximately 5,600 leading world journals in a broad range of disciplines (4). However, 90% of relevant information is published in 10% of the journals (5). This collection of journals or rather its smaller part represents the “mainstream” science (5,6). Yet all countries, irrespective of their economic, educational, and intellectual strength, publish scientific journals and strive to get them indexed in bibliographic databases such as MEDLINE, Current Contents, or Science Citation Index (7). In reality, journals from the “scientific periphery” are rarely included in the leading databases. SCI indexes less than 2% of journals in developing countries (7). At the same time, developing countries encompass 24.1% of the world's scientists and 5.3% of research spending (7). These countries fall into two categories: (i) underdeveloped countries producing very little or no scientific research output and (ii) “developing” or “semi-developed” countries present in the world's science, but contributing far less than the most developed. The latter group includes most of the European countries formed after the fall of communism but also a number of other countries, which lag behind the mainstream research for other reasons. Scientists from these countries are acquainted with the rules and criteria of publishing in mainstream science and occasionally produce high-quality reports in influential journals. But most of their scientific production is reported in local journals, whose quality is far below that in

Table 1. General features of scientific journals from developed and underdeveloped (small) countries

Feature	Characteristics of journals	
	Developed countries	Underdeveloped countries
Technical resources	excellent	often defective
Financial resources	good to excellent	moderate to low
Circulation	high	small
Indexing	a standard	an exception
Presence in libraries	regular	low or only in local libraries
Language	English	local language or imperfect English
Publication frequency	high (weekly or monthly)	low (quarterly or biannually)
No. of potential authors	high, often too high	low, often insufficient
Relative quality of authors	high	medium to low
Authors' origin	international	local
Readers	international	local or none
Rejection rates	high	low
Co-operative reviewers	many excellent	few disinterested
Impact factor	high and constant	low or none
Visibility	good to high	none
Electronic publishing	yes	often absent or connections slow

the mainstream journals (Table 1). The scientific communities in these countries feel as though their journals are close enough to the mainstream scientific standards and yet cannot reach them. The developed politely keep a distance, and semi-developed countries keep quiet, each hoping that they will be the ones catching up with the developed, this or the next year. Although journals from semi-developed countries may occasionally publish important results they often cannot reach the scientific community for technical reasons (e.g., language barrier or distribution) or simply because of the “invisibility” of such journals (8).

Vicious Circle of Inadequacy

Publication in science could be likened to a biological system that can grow, specialize, and eventually regress (9), so it is not surprising that some characteristics of publication are redundancy and wastefulness. We will analyse small journals from this perspective and look for mechanisms that determine their functioning.

Journals from semi-developed countries, even when published in English, are adversely affected by several factors. The standards for all journals, both from the scientific mainstream and periphery, are the same but in the case of journals from semi-developed countries they form a “vicious circle of inadequacy” (Fig. 1). In medicine, a vicious circle (10) is best likened to the mechanism of death after heart attack. The heart pumps the blood to the whole body, including itself via coronary arteries. When a branch of a coronary artery is closed, heart muscle receives less blood and becomes weaker. The weakened heart pumps less blood and diminishes its own nutrition, which further diminishes the pumping function of the heart muscle. This sequence of events reverberates until the heart stops working and the patient dies. In case of small journals, the vicious circle of

inadequacy also produces a clinically dead patient. Although the journal is published, its contribution to the scientific world is negligible – it is like a patient whose vital functions are artificially maintained but the brain activity is absent.

The confounding factors causing the vicious circle originate from relative scientific inadequacy of the environment in which a journal is produced, and have two important attributes. Firstly, the vicious circle they form progressively worsens a journal's position; secondly, the contemporary system of scientific communication actually enhances the differences between the “good” and “bad” journals, i.e., journals from developed and semi-developed countries. The confounding factors can be grouped in the following categories.

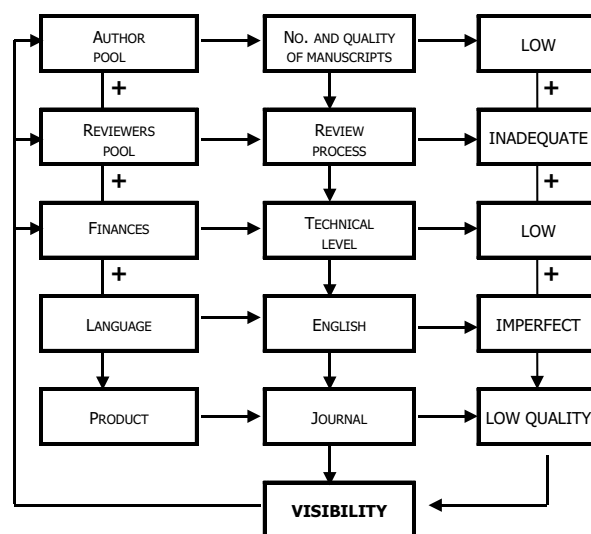


Figure 1. Vicious cycle of inadequacy of scientific journals from small countries. Arrows indicate feedback and pluses indicate cumulative effect of the confounding factors in the vicious circle.

Author Pool

The starting point of the vicious circle is the inability of the non-indexed journals to fulfil the requirements for high quality needed for indexing ("visibility" and "validity"): they cannot attract high-quality articles, which could bring the recognition of indexing institutions. A non-indexed journal does not face only the need to become indexed, but also bears the stigma of being non-indexed: neither highly nor poorly productive authors want to publish in such journals. Productive authors avoid small journals because publishing in them will not make their work visible enough and will not attract enough international attention. Less productive authors also try to reach more visible journals with the few manuscripts they produce.

Practically, there is no mechanism or potential in small countries that could break the first link of the vicious circle: the critical mass of productive authors is too small and weak to yield a surplus of scientific results that can be "sacrificed" for publication in a domestic, non-indexed journal. These journals cannot attract authors from abroad: researchers in developed countries actually have strong negative prejudice against science from small countries (7), and will hardly submit any, let alone a significant paper to such a journal.

The authors publishing in small journals submit their works for reasons that rarely relate to the essence of knowledge communication. They are attracted by friendly persuasion or patriotic or professional incentive (11), or by hope for a less strict review and/or faster publication. The "brain drain" from these countries further weakens local and empowers mainstream science (12). Emigrant scientists have no interest in contributing to a home journal because they are preoccupied with numerous problems of their own scientific survival and advancement in the new environment. The mainstream scientific community offers no help: there are no institutions, collaborations, projects, or other means of upgrading scientific publishing in semi-developed countries.

Review Process

Mainstream journals rarely publish their manuscript rejection rates (13) and, even more rarely, their "review rejection rates" (14), i.e., the proportions of unanswered requests for reviews. It is reasonable to assume that the two rates have inverse relationship: mainstream journals have high rejection rates and small proportions of unanswered requests for reviews.

The review process itself is burdened with problems of making a pool of reliable reviewers, subjectivity of assessment, insufficiency of the feedback control, and shortage of objective criteria, especially with respect to tuning the aims of the journal with the quality and importance of submitted manuscripts (9). These problems are augmented in small journals: there is a lack of reliable reviewers and disinterest of the reliable ones. The journal often barely manages to "fill up" a de-

cent number of pages with the received manuscripts: this leads to low rejection rates (15) and subsequent lowering of the acceptance threshold. The editor, whose role is of a gatekeeper (16), in small journal keeps the gates wide open. Pressure from authors and institutions and editorial biases further diminish the filtering role of an already insufficient review process. However, the objectivity of local (national) and foreign (international) reviewers, and their treatment of national vs. international manuscripts need not necessarily be different (15).

Financial Management

Supposing that the financial expenditures and gains of a journal are related (17), one can easily define another link in the vicious circle of inadequacy of small journals. Due to their poor visibility and quality, these journals have smaller readership (subscriptions) and fewer advertisements (market). Diminishing the circulation of the journal does not proportionally diminish the production price. The result is a journal that is never financially self-contained (independent from, for example, governmental subsidy). This adversely affects the quality of production and timely publication, discouraging good authors from submitting their manuscripts.

National funding sources in such countries tend to have low and/or biased criteria, and scientists and their professional societies insist on having many "scientific" journals (18). Thus, the small resources available are inefficiently distributed among a number of insignificant journals.

Language

All high quality journals, at least in medicine, are published in English. There are many more periodicals published in local languages, but their contribution to the wealth of mankind's knowledge is minimal (19). Almost all experts in the field acknowledge the existence and importance of non-English scientific journals (20), but these journals mostly do not fulfil the requirements necessary for contributing valuable information to the general knowledge: visibility, accessibility, and acceptance by the mainstream of the world science/scientists.

The reason for publishing a scientific journal in a non-English language is usually the inability of local readers to read English. At first glance, this is a valid and reasonable argument. However, inability of the scientific population to read English reveals that it is neither able to receive nor to convey information from the mainstream science. If the purpose of a journal published in a local language is to inform its readers, who cannot read English, of the developments in the mainstream science, their existence is necessary and honorable but the journals are denied the function of contributing new knowledge to the mankind. Yet, these journals usually do not want to lose the scientific attribute and eventually end up publishing reports of scientific quality lower than the local average or, as is often case in medicine, reports

with insignificant results (21). Their existence thus becomes counterproductive, not only because they do not contribute to the human knowledge, but also because they promote scientists who do not deserve that status. The third flaw of the system is that the authors publishing only in these journals give up the effort to produce "visible" information.

Journals from non-English speaking countries, which publish in English, sincerely aim at contributing to the world's knowledge, albeit by a small degree. Yet, language-wise, they are inferior from the start. The quality of English in such a journal cannot reach the level that would satisfy readers in mainstream science (editors, authors, reviewers, those who decide on indexing). The attempt to reach high-level English fails at two points: lack of language experts and/or the price of their services, and the specificity of scientific language – the language of a scientific report is different from the language of general literature studied at universities. The effort invested in producing the journal is greater, and, with other setbacks, poses an almost insurmountable barrier.

Visibility and Significance

The number of subscribers, i.e., journal's circulation, determines the visibility of a journal and is its key financial source. The two factors are interdependent and are yet another link in the vicious circle of small journals: the less a journal is present in the system of scientific communication the smaller its subscription; decreasing numbers of subscribers adversely affect financing as well as the author pool and, finally, the quality of the journal.

A current standard measure of visibility in the scientific world is the average number of citations that an article receives in subsequent publications in the same or other journals: impact factor of a journal is a number of citations in a current year to scientific articles published by a journal in the preceeding two years, divided by the number of scientific articles it published in those two years (6).

The articles published in a weak (small) journal receive few citations. The reasons are numerous and not necessarily related to the quality of its articles: (a) the authors do not publish often and thus rarely cite themselves in subsequent publications; (b) they do not belong to a strong enough research group that would cite their work independently or in co-authorship; (c) the topic of their research is often not interesting enough to the mainstream science (mostly because of the lack of sophisticated and expensive research technology); and (d) they cannot be found by searching standard databases. Indexing in databases (printed or computer), which allow systematized access to published scientific reports is a major determination of a journal's visibility. For small journals, the inability to get indexed increases over time the barrier to becoming indexed: lack of citations for a long time makes inclusion more difficult because it

means low impact factor, and the long period of non-indexing itself indicates the journal's inadequacy.

The impact factor has been severely criticized as a quantitative measure of journal quality (22,23). It does have its weaknesses but it is currently the most relevant and just measure of a journal's quality. If the differences between different fields of research are kept in mind (24), the impact factor is still the best predictor of the journal's quality. Unfortunately, it is available only for the articles in journals already indexed in the Science Citation Index, making it a closed system favoring those that are already in and discriminating those that are out.

What Can Be Done?

If our description of the constantly worsening situation of small journals is true, one may ask whether it is plausible or necessary, and to what degree of urgency, to try to improve their situation. The alternative is to let the market run completely free, i.e., let journals fight for recognition and impact, with a small fraction of the best producing (publishing) the best, and the great fraction of small and medium journals barely surviving or actually polluting the arena of knowledge acquisition. This may seem reasonable: only 10-15% of all articles published on a particular topic are useful (25); half of the articles are never cited, not even once; and half of the journals on library shelves are never looked at (26).

We believe that there are at least five practical reasons why the weak journals have to be helped. Their growth and development would both add new knowledge and increase the competition. In the environments where these journals are produced there is original and unique knowledge that is worth transferring to the general level. Improving the level of scientific communication in semi-developed environments would improve their science and, in turn, the life, which would lessen the tensions in these environments and their relation to the developed. Finally, small journals may stimulate their authors to write more and better (27) and serve as their publishing medium until their research reaches the level suitable for mainstream journals.

However, the small journals should not hope that they will get better just by some unspecified external effect – their awareness of the problems is the key incentive to work and improvement. On the other hand, the mainstream scientific community should accept that the small journals are not considerably contributing, at least at the present time, to the knowledge of the mankind but do serve useful functions.

Quantitative evaluation of scientific communication includes measures like citation counts, pages, regularity, visibility, and new measures that might be devised. The small and weak dislike quantitative measures of quality because they are painful for them, and the big and strong usually disregard such measures because they do not need

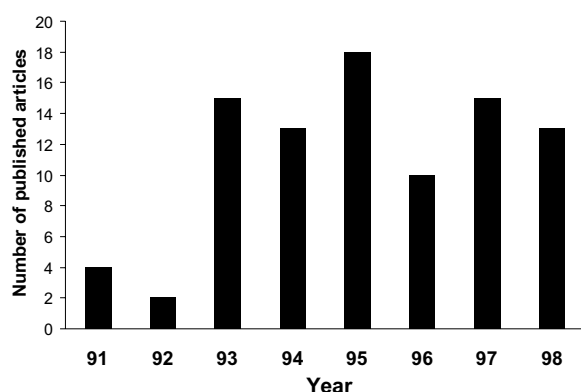


Figure 2. Articles by Croatian authors published in international journals with the help of the *Croatian Medical Journal*.

them. However, quantitative assessment of quality, regardless of how imperfect it may be, serves as the key stimulating factor, and, equally importantly, as a protective measure against false democracy, i.e., hiding the problem on the part of those who are against advancement (28). There is no advancement without diagnosis provided by a valid quantitative assessment. Opponents of advancement are those in semi-developed environments who hesitate, consciously or not, to face international criteria and those in the developed world who do not care.

Experience of a Small Journal from a Small Country: the *Croatian Medical Journal*

Before we offer possible remedies for the improvement of small journals, we will present our experiences in starting and developing an international scientific journal in a small country.

The CMJ was first published when the war in Croatia was at its peak (1,29). Why did we start a journal when there were other 40 journals in Croatia from the same field, or, as Zdravko Lacković, a member of the CMJ Editorial Board, put it in his 1992 editorial (18): Does the world need CMJ? We followed his answer (18): "Yes – if it is going to be a high quality scientific journal." That was exactly our aim: to shake Croatian scientists out of the false security of domestic journals and set high standards for publishing in biomedical research in Croatia. The Editorial Board focused on working with authors and helping them improve the presentation of their data (28,29).

Work with CMJ Authors

We introduced an "author-friendly" pre-review of manuscripts submitted to CMJ by domestic authors. The editor-in-chief reads the manuscript, and, if the data are sound, the manuscript is returned to the author with detailed instructions for improving their presentation. This "exchange" of the manuscript is repeated several times before the appointed and the Statistical Editor are satisfied with the presentation of the data. The manu-

script is then sent out for evaluation by two international peer reviewers. If the reviews are commendable, the author is asked to make all the requested changes, and the final version of the manuscript is corrected by a Manuscript Editor, who has a BA degree in English. The editor-in-chief makes a final check for any remaining flaws. In this way we saved a lot of valuable data from being lost to the scientific community (29). Over the years, CMJ became a key source of scientific data on the medical aspects of the wars in Croatia and Bosnia and Herzegovina (30,31).

Work with Authors Writing for Other International Journals

To help them break out of the isolation of the "scientific periphery", we have encouraged physicians with experience in war medicine to present their work to the international medical community. We used a similar approach to that with CMJ authors (most of them already had that experience); during the process, the authors learned more about secondary publications, indexing of journals, and styles used in different journals. Our joint efforts over the last 8 years resulted in more than hundred articles published in non-Croatian journals indexed in Index Medicus, Current Contents, and Science Citation Index (Fig. 2).

Work with Future Authors – Medical Students

Extending the work with fellow physicians to students was a natural move for the CMJ Editorial Board: young men and women at Croatian medical schools are future medical researchers and those who will determine the future of Croatian medical science. With the help and support of the Zagreb Medical School, four members of the Editorial Board introduced a mandatory graduate course in scientific research into the curriculum, starting with the 1995/1996 academic year. Our aim was to teach second year medical students the principles and ethics of scientific research, access to literature and citation databases, practical approach to medical statistics, and principles of scientific writing. A textbook in Croatian (32) and small-group work are focused on helping the students understand the necessity for clarity and simplicity in presenting scientific research. Using articles from major medical journals, students become acquainted with issues that are universal regardless of the language used: the structure of a scientific article and the rules or suggestions for writing individual parts of the manuscript.

How to Help Small Journals

Starting from our own experience, we believe that small journals from less advantaged countries may be helped on several levels.

Small Journals Helping Themselves

The work of small journals should first be strengthened by and within themselves, and then within their specific (professional, regional, national) environment. The key to success is: hard

work, dedication, perseverance, and more hard work!

There are many ways in which the work at the editorial office can be improved – they all require a lot of work and dedication. For example, the review process can be upgraded by permanent positive and negative selection of reviewers on the basis of the quality of their answers. This would allow building up a list of reliable reviewers. A system of tracking the manuscripts and the review process should be established and maintained. The personnel should be carefully selected. The board(s) should have diligent and able young professionals, not false authorities who like titles but do little work. The standards of effective editorial process, in its every step, should be paid maximum possible attention: every manuscript should pass at least two reviews regardless of who the authors are or how much they hurry the publication; the articles should be published according to the order of their acceptance, references should be checked independently of the authors, galley proofs should be checked by professionals (or volunteers) regardless of the authors' corrections, and other procedural steps followed to assure readers of the scientific quality of what they are reading.

The most important thing for a small journal is its profile and aims. The small cannot compete with the great in the hot topics of mainstream science (e.g., heart physiology or molecular medicine) but have certain chances, even advantages, in the originality of specific diseases, needs, environmental characteristics, even political, social, or martial specificities which differ from the rest of the world – at least because these specificities belong to the humanity as a whole. In other words, local problems (chronic diseases of regional nature), even tragedies (disasters, wars, disease outbreaks) can be sources of precious experience for all of mankind.

Small Journals Helping Each Other

Help can come from exchanges of journals, authors, and editors. Exchange of journals is a mechanism of (a) acquiring free journals for local libraries, and (b) assuring that one's own journal is officially received in an institution (library) in the other country.

“Exchange of authors” means that editors stimulate authors in their environment to publish in the partner journal in another country. This can be particularly helpful if each journal defines its profile so that it can direct to the partner journal those articles that do not fall into its own scope.

Editors can also exchange experiences, either during short visits or via e-mail, learning specificities and experiences of the hosting journal, increasing thus mutual understanding, sharpening the journals' profiles, and cooperation.

Large Journals Helping Small Journals

Large journals could sponsor small ones. For a small journal such sponsorship would mean an easy access to information and advice, training of

the personnel, including editor exchange, journal exchange, and article exchange, i.e., re-directing some of the unaccepted articles to smaller journals, after the suggestion of editors of large journals. The criteria for such re-direction can be the scope of articles, authors origin, small journal's general policy, etc. Accordingly, the editor of a small journal could work with his or her authors to write articles of specific interest for a larger partner journal, for example a thematic issue or specific subject within the geographic area of the small partner. In practice, two or more large journals can unite in helping a single small journal, thus sharing and diminishing the “burden”. By the same token, a single large journal could help several small journals. Such cooperation would benefit not only the small but also the large journals: they would learn about the specificities of different regions and possibly develop a reliable source of interesting information.

Using the Internet

The Internet may become a meeting place for editors and journals – a place to share experiences and learn from each other. An example is the World Association of Medical Editors (WAME), a completely virtual organization that meets on the Internet and provides useful resources for its members. WAME is especially keen to attract editors from the less advantaged countries, with the goal of stimulating education and promoting high scientific and ethical standards among medical journal editors worldwide.

Preserving and upgrading of the present system of journal evaluation includes the development of electronic publishing and all accompanying technological and intellectual achievements in the field. However, contrary to the current high hopes for global availability of the Internet, electronic publishing is not a replacement of the existing system, but a part of its upgrading and technological advancement (33). With time, electronic globalization will likely eradicate many economic reasons for electronic inequities and remove technical barriers, but electronic publishing cannot solve the problem of small journals. Electronic publishing, in one or another form, will retain high present standards of quality, (English) language, commercial interests, and will only add new problems: new technology, new experts, better infrastructure. Those who will follow slower will lag longer.

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