

# **PROPERTIES OF SCIENTIFIC PERIODICALS UNDER BIBLIOMETRIC ASSESSMENT**

**V.S. Lazarev**

**Research Institute of Hematology and Blood Transfusion, 160 Dolginovsky Tract,  
Minsk, 223059, the Republic of Belarus (ex-USSR)**

## **Abstract :**

The methods of bibliometric research of scientific periodicals are studied much better than the properties of periodicals though the latter are the subject of the assessment. Since the properties in most cases are not being evaluated directly, the problem is to identify the intermediate that is DIRECTLY evaluated by a concrete method and to determine, which specific property of a scientific periodical is reflected by this intermediate most ADEQUATELY. Such an attempt is undertaken in the present work for practically all the methods that are used in corresponding studies of periodicals. By means of philosophical speculations the author finds out the "method - property" conformities.

**scientific periodicals, bibliometric assessment, value, productivity, impact, citation analysis, publication count, document handling data, document use, questionnaire survey, peer assessment**

# PROPERTIES OF SCIENTIFIC PERIODICALS UNDER BIBLIOMETRIC ASSESSMENT

V.S. Lazarev

Research Institute of Hematology and Blood Transfusion, 160 Dolginovsky Tract,  
Minsk, 223059, the Republic of Belarus (ex-USSR)

Since Gross and Gross [1] produced in 1927 the list of scientific periodicals, ranked according to the level of their citedness in a specialized chemical journal, and in 1934 Bradford developed the list of periodicals ranked according to the level of their papers being reflected in a bibliography index on geophysics [2], hundreds and hundreds of papers devoted to the quantitative assessment of the ability of periodicals to correspond to the professional information needs of specialists in a concrete scientific discipline appeared.

However, not all the authors pay sufficient attention to the nature of the specific properties of periodicals under study that are quantitatively assessed in the process of periodicals selecting and ranking. Some of them do not realize that a method used in a study reflects a CERTAIN CONCRETE property of a periodical which is more specific than a general ability to correspond to the professional information needs of the specialists, the others seem to be of the opinion that such properties are somewhat conditional, totally derivative from the method of bibliometric evaluation, and hardly existing by themselves as an objective reality.

Non-understanding that the SPECIFIC properties that determine the ability of periodicals to correspond to the professional information needs of specialists in a concrete domain actually exist as an objective reality and that a methods used in a study MUST correspond to a specific property under assessment generated the illusion that a nomination of such properties may be absolutely arbitrary. As a result, in the papers devoted to the periodicals bibliometric assessment, the following nominations of the properties are to be found: "productivity", "profitability", "significance", "information significance", "scientific significance", "importance", "descriptiveness", "quality", "usefulness", "utility", "worth", "value", "information value", "readability", "information potential" and so on; the meaning of the number of the listed terms being the same, while some others are not defined at all(\*). Besides, I noticed e.g. 4 (!) meanings of the term "productivity" (despite the fact that the initial Bradford's meaning of this term is quite concrete), 2 meanings of the "term" "significance", 2 meanings for "information value", 4 meanings of "descriptiveness" etc.

It is understandable that for the correct nomination we are to realize the nature of the property to be nominated. But since the properties under study are not directly measurable, but connected with the corresponding indices in a probability (stochastic) manner [3, p. 16-17], while the methods themselves are cognized much better than the properties that they reflect as operating with directly observed indicators, the cognition of the properties to be assessed may be achieved only if we start with the cognition of the methods.

The following general methods of the assessment of the ability of periodicals to correspond to the professional information needs of a domain representatives are noticed in my collection:

1) PUBLICATIONS count by a de visu analysis of periodicals (including such extravagant approaches like the count of translated articles, count of political articles in technical periodicals etc.); count of publications, reflected in bibliographical indexes, in abstractive journals, in data bases, in card files, in documentary flows forwarded to a potential user by the system of selective dissemination of information, in other secondary information sources.

2) Count of various indicators of CITATION ANALYSIS: e.g. the total level of a periodical CITEDNESS in certain SPECIALIZED periodicals, the structure of references in CITING periodicals TO certain SPECIALIZED periodicals, the quantity or portion of citations only to recent papers of a certain periodical; calculations of fractions (number of citations divided by the number of papers published in a cited or citing journal, like impact factor, "discipline impact factor" [4] etc.).

3) Count of various kinds of readers requests to scientific periodicals and copies and reprints of the selected articles published in periodicals: "spontaneous" requests; requests inspired by reading the abstracts, forwarded earlier to a reader by a system of selective dissemination of information or requests due to some other bibliographic information service; requests in a local library or through interlibrary loan etc.; count of time spent by the readers to reading the periodicals in a reading-room; count of the number of the received photocopied articles from various periodicals; count of times a certain periodical was taken from a library; count of refusals to the readers requests to certain periodicals or selected papers published in them... In short, this group includes the quantitative assessment of indicators of all kinds of READERS ACTIVITY DIRECTED TO ORIENTATION IN PERIODICAL MATERIALS, THEIR SEARCH, FINDING AND FURTHER (POTENTIAL) READING.

4) Quantitative processing of the data of questionnaire surveys, interviews, peer assessing and other possible METHODS OF EVALUATION OF SCIENTISTS ATTITUDE to periodicals.

### PUBLICATIONS COUNT AND PRODUCTIVITY OF PERIODICALS

The specific methods of the first group (or the first GENERAL method) must not presume any problems about the corresponding reflected property: the content of the method is the count of directly the number of publications and, in the context of what Bradford has written ("... the law of distribution of papers on a given subject in scientific periodicals may ... be stated: if scientific journals are arranged in order of decreasing PRODUCTIVITY of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to the subject and several groups or zones containing the same NUMBER of articles as the nucleus ... etc." (Capitalized by me -- V.L.) [2, p. 85]) it is absolutely clear that the corresponding property is PRODUCTIVITY. The meaning of this term, though, not defined by Bradford, is also understandable. There is a fairly good definition of productivity as "a relative characteristics of a periodical, determined by the number of articles published in this periodical that relate to a given (selected) theme or a branch of knowledge" [5, p. 350]; however, I think there might be still more exact definition of this property e.g. "PRODUCTIVITY is the property of scientific periodicals to contain the articles relevant to a concrete subject, characterized by the quantity of such articles". It is important to note that this property is not artificial, not a derivative from a method applied, but exists by itself as an object of reality.

The productivity case is the simplest one. It is because this property can be DIRECTLY MEASURED by the number of relevant articles when we fulfill a de visu count of relevant publications; also, when the abstracts or bibliographic descriptions are counted, an intermedium is both obvious and minor. At the same time, such substances like "significance", "quality", "value" etc. might be only INDIRECTLY quantitatively ASSESSED by the direct measurement of some indicator of a process that may denote to such properties.

### CITEDNESS, USE AND VALUE OF PERIODICALS

The content of the second methodic group is the count of citation analysis indicators. This group is divided, in fact, in two different groups, too, and in this chapter we shall consider what CITEDNESS level of documents really reflect. The standpoint of the recent paper by Salmi [6] (who produced one more attempt to demonstrate that calculation of citedness level is not so much a good method for evaluation the "value", "quality" or "impact" of cited documents), is that "the figures resulting from citation analysis are ... statistical figures of scientific activity" [6, p. 17]. It may be agreed, but the question arises: "what kind of activity?" The next question is if this activity really denotes (not denotes?) to something like "value", "impact", "importance", "quality", "significance" or whatsoever that could not be measured directly?

And, finally, what is the right name or names for such a property (properties?) that are reflected by citedness levels?

In general -- let me be allowed to consider only the general trends, but not the plentiful exceptions, -- citedness level

DOCUMENTARY CONFIRMS THE ACTUAL USE OF CITED SCIENTIFIC DOCUMENTS THAT HAS ALREADY TAKEN PLACE during the fulfillment of a relevant creative work by the authors of citing papers: in general, first, a document is read; then -- if it was not thrown away as evidently useless -- it is being considered; then -- if it is considered to be helpful, -- it is USED (for comparison, including disproving; assimilation of the methods described etc... etc.); then it is CITED (if the scientific ethics of the author, editorial policy of the publishers etc... are OK).

It does sound absolutely obvious and I am sorry for reminding of some trivial things. But I am COMPELLED to speculate in such a manner, reconstructing a lot of notions just ab ovo because of the terminological chaos that does exist AS A RESULT OF CONCEPTUAL MISUNDERSTANDINGS. Speculative way is the only way to confirm the correspondence between a method and a matching property: all the attempts to do it "empirically" are based on the immanently presenting wrong assumption that some of bibliometric methods may be used as "control" or "standard" ones. But such "standard" methods do not exist: if they were, all the plentiful and repeated speculations would be of no sense at all since the validity of a method, say, for the value evaluation would be once and forever determined from the results of the empirical comparative studies of the simultaneous application, say, of citedness level estimation as an indirect aid of the value assessment and of a standard method of direct measurement of it. Now we can reformulate the second question as "DOES THE ACTUAL USE OF CITED DOCUMENTS REALLY REFLECT THE "VALUE", "IMPACT" OR "QUALITY" OF RESEARCH?"

In philosophy the notion of "VALUE" is treated as the criterion of preference in the situation of alternative choice [7, p. 111] (a concrete reference IS CHOSEN to be cited), while as for scientific literature, the notion of value is treated also as its ability to facilitate reaching the

target of the researchers activity [7, p. 111] (i.e. to accomplish a study described in a citing paper).

Moreover, in the information science there is a notion of the value of information which is defined as the "property of information, determined by its fitness for practical USE in various spheres of human activity for the achievement of a certain aim" [5, p. 464]. The value of information is directly connected with its USE, and we have all the right to expand this conclusion to a single document or to a scientific periodical as an organized collection of the documents: "outside a scientific document the human society does not possess the scientific information, too, since it is namely a document that is a material form of its fixing" [8, p. 102]. Then, it is hardly possible at all to obtain any true characteristics of the value of some object without the experience of its USE because the value of an object is determined "not only by its internal structure per se, but also by the fact that an object is involved in the sphere of social human genesis" [9]. It is too well known how the most outstanding scientists failed in expert evaluation of the value of various scientific works BEFORE the latter started to be actually used [8, p. 167]. So, it might be clear, that being a method of evaluation of the actual use of the documents, the count of citedness is a method of an indirect evaluation of the VALUE of cited documents (or, to be a pedant, their SCIENTIFIC value because the value may be aesthetical, historical etc. [10, p. 51]) and, correspondingly, of the value of periodicals, where the cited articles were published.

Besides value, there are two other characteristics of scientific documents, mentioned by Salmi, that are hypothetically reflected by estimation of citedness level, viz. "quality" and "impact" of cited documents [6, p. 17]. To decide whether it is so we must search for the exact meaning of these words and to compare it with the meaning of "value".

Table 1 demonstrates, that first [11], if "quality" is cognized rather abstractly and strongly depending on a cognizing subject (like e.g. an expert), the "value" assessment does not depend on abstract speculations of a cognizing subject, but on relations to his concrete needs or aims. From this viewpoint, citations bear relation with aims and needs of a CITING AUTHORS, but not with his abstractive speculations. As for citations COUNT itself, it is an "automatic" process, on which the will of a counting person has no influence. So, it is confirmed, that citedness level reflects VALUE, while the PEER

No of pair of the definitions	"Value"	"Quality"
1	"...is the result of assessment, i.e. the determining the relation of the known object to the striving, need or aim of a human being..." [11, p. 265]	"...is a category that demonstrates the characteristics of the object which is attributed to it only as an object of cognition, therefore the characteristic that exists only relatively, depending on a cognizing subject" (knowledgeable human being [11, p. 127]
2	"...is attributed or relative worth, merit or usefulness" [12, p. 990]	"...is character of nature as ... distinguishing a thing" [12, p. 740]
3	"...is... that quality of thing, according to which it is thought of as being more or less desirable, useful, estimable, important etc..." [13, p. 2018]	"...is ... the degree of excellence which a thing possesses" [13, p. 1474]
4	"...[is being cognized through]the satisfaction of the desires of human beings that is conditional, in general, on the possession and use of material objects... [or] ... immaterial sources of satisfaction" [14]	"...Where, for example, two two kinds of cloth are said to differ "in quality", it would usually be meant not merely that they differ but that one kind is better (by appropriate standards) than the others..." [15]

Table 1. Some definitions of the meanings of the words "value" and "quality" relevant to the present subject.

ASSESSING (that was treated in [16; 17] as a "control" method in comparative studies of citedness level estimation and peer assessing) reflects the QUALITY: being totally dependent on a cognizing subject and irrespective of his concrete needs or aims of them, the peer assessment is IMMANENTLY the assessment rather of the quality, no matter if the peers were asked to assess quality, value, productivity or whatsoever.

So, from the very first pair of the definitions it might be concluded that 1) "value" and "quality" are NOT synonyms and 2) the peer assessing is neither a standard nor, possibly, a relevant method for the assessment of the documents value. The second and third pairs of the definitions [12; 13] demonstrate that "quality" does not bear relation with merit or usefulness, not, therefore, being involved in satisfaction of concrete needs. All the conclusions are supported by the last pair of the definitions which finally demonstrates again that the value assessment is associated with the possession and USE of an object [14], while "quality" is being cognized irrespective of the mentioned processes and with the aid of some IDEAL standard [15].

So, the citedness figures do not reflect quality. Let's pass from the "quality" to an "impact". On the level of the "common sense" it looks obviously that citedness reflect impact of cited papers. However, we must have a distinct and recognized definition of the term "impact" for real understanding of the matter.

It seems unbelievable, but, despite the enormously frequent use of the term "impact", an appropriate definition is hardly to be found. Even in the paper by Kara-Murza [18] which aim was to disprove the opinion that the analysis of the citedness level may be a good method for the quantitative assessment of the impact, the term "impact" is not defined. Also, the special dictionaries do not contain the definition of this word.

The definitions from the ordinary dictionaries give an commonsense idea of what "impact" is: "influence or effect" [12, p. 451] and "a forcible momentary touch, contact or impression" [13, p. 910]. Of course, we can say that citedness reflects an influence or a strong impression of cited documents on citing authors, but such an influence (or "impact") of a valuable paper is JUST A CONSEQUENCE of a paper's value. And this consequence is NOT so much obvious or compulsory: if a certain researcher frequently cites a certain paper, it is not known for sure if he is strongly influenced by it or he is not thinking a lot about it at all, but it IS known, that he USES it repeatedly. The opposite situation is even more obvious: one might be strongly impressed by some paper, but, if he or she is not working now in the same direction, so he or she would not use it actively, would not cite it... and the "impact" of the document would NOT be reflected. We may conclude, therefore, that impact (influence, impression) COULD be reflected, of course, by citedness, but IN MUCH MORE STOCHASTIC MANNER THAN VALUE IS REFLECTED. And when the term "impact" is applied to indicate a major property of a document reflected by the level of its citedness, so in this case this term is just a redundant one.

We can compare also, of course, the notion of the use with all various possible definitions of "profitability", "significance", "importance" and other words mentioned in the beginning of the paper, but it seems already clear that the MATCHING property from the viewpoint of philosophy [7; 9; 11], political economy [14], information science [5] and a common sense [12; 13] is VALUE. However, I think that the term "usefulness" ought to be commented as having the same root with the word "use".

The meaning, anyhow, is quite different. The vocabulary definition of the word "usefulness" is "the quality of state of being useful" [13, p. 2012], while "useful" is defined as "that CAN be used in ADVANTAGE; serviceable; helpful; beneficial; advantageous; often having practical utility" [13, p. 2012] (Capitalized by me -- V.L.).

The definitions of "benefit" [13, p. 172] and "utility" [13, p. 2013] do not add anything to the conclusion that, despite the common root, the term "usefulness" is less appropriate than "value".

As I mentioned before, peer assessing is NOT a control method for determining validity of citedness analysis. That is why the presence of correlation between citedness figures and the results of peer assessing found by some researchers for certain research fields cannot mean that one and the same property was under study; it may mean only that "value" and "quality", though being different properties, have a lot in common. What about several attempts to find a positive correlations between the level of citedness of an individual author and the probability of awarding a Nobel prize to him or her?

According to the Founder's will, the Nobel prizes ought to be awarded "to those who, DURING THE PRECEDING YEAR, shall have conferred the greatest BENEFIT on mankind" (cited according to [19], capitalized by me -- V.L.). The "benefit" is an "advantage; profit; anything contributing to an improvement in condition" [13, p. 172], it is neither "value" nor "being used". "Contributing" reminds us of an "impact", but we have already agreed that "impact" is just a nonobligatory consequence of the "value". At the same time the citation levels of the so-called "Nobel class authors" were normally estimated NOT for the preceding year, but for the whole carrier of an evaluated author.

There are some other properties of the documents which meaning is rather close to the one of "value" ("pertinence", "topicality" etc.). Though the mentioned words seemed to be never associated with properties of scientific PERIODICALS under bibliometric assessment (they are referred to single documents only) the same analysis as in case with "quality" and "impact" was fulfilled by me, but the conclusion concerning the matching property remained the same.

Though it is understandable what the (scientific) value of (scientific) periodical is, the utmost frequent misuse of the term "quality" in corresponding studies of scientific periodicals (instead of "value") and the ongoing discussions on the essence of a property of reflected by citedness figures make me think that we need to have a recognized definition of the value of a scientific periodical. As for me, I can propose the following draft:

"(Scientific) VALUE of a (scientific) periodical is a property of a periodical to be fit for a use in a (professional scientific) activity of representatives of a certain domain for the achievement of their (professional) aims".

The value of a periodical depends on the "total" value of the published separate papers much more than on a periodical productivity (i.e. on the number of relevant articles): if some journal A published during a certain period, say, 100 relevant papers, each of them being cited once in the following period of time by a domain representatives, and the journal B published during the same year 50 relevant papers each of them being cited 5 times by the same domain during the same period, we should undoubtedly consider the second journal to be more valuable as being more actively used:  $(50 \times 5) > (100 \times 1)$ .

Anyhow, it is understandable that the productivity, though being an absolutely independent property, may influence on a periodical value (say, a journal with 100 papers each cited once by a corresponding domain during a while is less valuable than another one with 200 papers each cited also once).

### READERS ADDRESSING TO THE DOCUMENTS, USE AND VALUE OF PERIODICALS

The third group of specific methods (or the third general method) of the quantitative assessment of the ability of periodicals to correspond to professional information needs of the domain representatives is the quantitative studies of all kinds of readers activity directed to orientation in periodicals publications, their search, finding and further (potential) reading. Which property is reflected by this methodic group?

There are persons who believe that the magnitudes of interlibrary loan borrowings [20], borrowings in a local special library [21; 22] and analogous indicators directly reflects the USE of periodicals. To decide if it is so, we are to compare the nature and essential possibilities of the application of the citedness level estimation and of the studies of the readers activity of the mentioned kind. (The speculative way of comparison is the only way to discover a true answer again as it will be demonstrated below.)

When I told about the "actual use" before, I meant such things as comparison, assimilation of ideas or methods, discussions (including disproving!) etc. IN A CONCRETE CREATIVE WORK of the user; so, I meant the use in the context of very concrete and very important needs and aims of a researcher, such a "use" that in philosophy is the most obvious means of cognition the VALUE. From this standpoint reading just "to know about" and not followed by the involvement of the read materials in the creative work (followed by citations!) is NOT AN ACTUAL USE, IT IS ONLY A PREREQUISITE FOR IT. So we may say that the level of readers activity of the mentioned kind with its unknown and documentary non-confirmed motivation is an indicator of just a POTENTIAL (or intentional) use, which might be used



correspondingly for the assessing of POTENTIAL value of the handled documents. Of course, some of the read materials ARE actually used IN THE FOLLOWING, but by the examination of such the readers activity one cannot forecast if a document will be used in this manner, as well as -- in most cases -- if it will be really read at at. Some authors still search scrupulously for the exception cases when citedness level studies do not reflect the actual use or when the actually used articles are not cited because they believe that the examination of the borrowings of the documents is more helpful in such cases. This misunderstanding might be caused by the existence of the library term "use of the library stocks", the latter being evaluated by the level of DOCUMENTS OUTPUT from the library. But, first, the meaning of this term includes all possible aims of documents readings (such as curiosity satisfaction, compiling bibliographic descriptions by librarians etc.) [23, p. 59], and, second, there are numerous studies that are called "studies of the use of the documents" based on OTHER indicators of readers activity -- of the similar nature, but not "covered" by the definition of the term "use of the library stocks". So, the absence of correlation between readers requests and citations figures discovered by some authors including Scales [20] is determined by the differences in the essences, reflected by the two methods, the differences, which also reveal themselves "qualitatively" through the fact that a document to be potentially used might be requested once and then cited as many times as in many papers being created it was actually used, i.e. once, a few times, a lot of times, never.

The basic differences in general possibilities of the application of the examination of all kinds of readers activity directed to orientation in periodicals publications, their search, finding and further (potential) reading and the analysis of citedness figures for the assessment of the use of the documents, featuring the borderlines of reasonable applications of the two approaches in library studies are summarized in Table 2 that includes also the main conclusions of my Russian-spoken paper [24]. Featuring the borderlines of reasonable applications of these two approaches in bibliometric studies of periodicals, this table gives a final answer to the question concerning the validity of citedness count approach for determining the use of the documents and leads to the following conclusion: since the citation analysis reflects "only" the actual use of the documents and, in general, reflects the use more precisely, the application of this method enables a much better indirect assessment of the value of scientific documents than the examination of readers addressing to them.

Basic Differences in...	Readers Activity data...	Citation frequency data...
(1) ...the scope of reflection of the use:	(1)...might evidence either that the documents were actually used in a particular work, or were just read without specific consideration in its content or just supposed to be read etc...	(1)...are supposed to reflect the real use of the documents in a particular work, viz. in the creation of a citing paper
(2) ...the precision of the assessment of the use	(2.1.)...confirm the hypothetical use; the actual use is not being confirmed, the precision is not sufficiently accurate;  (2.2.)...may reflect a momentary action followed by repeated, single or zero actual use, which is not reflected by these data; so, the precision is poor again;	(2.1.)...enable more precise evaluation since the real use that has already taken place is reflected;  (2.2.)...reflect repeated use confirmed by repeated citations, enabling more precise assessment
(3) ...the rapidness of the assessment of the use	(3)...reflect the use very rapidly since the readers activity coincide in time with the potential use and precede the actual use (if any)	(3)...follow the actual use, reflecting it, therefore, much less rapidly
(4) ...the possible applicability in library stocks development strategy	(4.1.)...reflect all kinds of documents use which are sufficient data for this purpose;  (4.2.)...reflect the use of only the documents, that are physically available	(4.1.)...reflect only the actual use of documents in a concrete work which the THE MOST IMPORTANT BUT NOT TOTALLY COMPLETE data for this purpose;  (4.2.)...reflect the use of the documents IRRESPECTIVE of the physical availability of them
(5) ...the possible applicability for the evaluation of scientific research	(5)...as reflecting all kinds of documents use without pointing out the use for the creation of the new documents, these data are good for the assessment of the "information environment", but not the scientific research itself	(5)...as reflecting the actual use in a concrete work, these data may be used directly for the evaluation of scientific research in terms of "information consumption", "information links" or "cognitive basis"

Table 2. Basic differences in general possibilities of the use of the data on the mentioned readers activity and on citedness frequency for the assessment of the use of the documents.

It might be noticeable that the results of application of some of the specific methods of examination of indicators of all kinds of readers activity directed to orientation in periodical materials, their search, finding and further (potential) reading may be influenced by the productivity of periodicals: a photocopy, for example, is requested normally only once to be used either once, or a few times, a lot of times, or zero times, while the indicator which a bibliometrician operates with in this case does not in the least reflect the mentioned differences in the scope of the use (while the citation count DOES reflect it). We can see that the magnitudes of the "corresponding" indicator of the repeated or zero actual use would be absolutely the same; at the same time these magnitude would reflect to some extent PRODUCTIVITY of a periodical from the viewpoint of its ability to be POTENTIAL used. We see that in such a case two concrete properties are reflected in some "mixed" manner, and this phenomenon gives more status to the idea about the necessity in a term designating a "synthetic" characteristics of a periodical to correspond to the information needs of a domain, to the idea of coining a generalized recognized term -- the idea caused by the terminological chaos in nominations of this property, analogous to the one in nominations of specific properties. (This problem is being discussed at the end of the paper.)

However, now it seems clear that we need to have a short generalized term depicting all kinds of readers activity directed to orientation in periodical materials, their search, finding and further (potential) reading: there are various kinds of the mentioned activity that deals in general with the same process -- the potential use of documents or the intention of researchers to use them. On the other hand, though a lot of generalized terms, designating this activity, were arbitrary used in the special literature from my collection, the paradox was that all these terms were THE MISUSE OF STANDARDIZED TERMS THAT HAD QUIET DIFFERENT MEANINGS. The misused terms are plotted in Table 3 that demonstrates both the insufficiency of their being used as generic terms with the necessary meaning and the intuitive inclination of bibliometricians to the use of a STANDARDIZED term that will "cover" all kinds of the mentioned readers activity. In order to overcome these discrepancies, I have written in 1985 the paper entitled "Readers handling scientific periodicals as an indicator of periodicals thematic orientation", but it occurred to be impossible to publish it: the referees felt that I my intention was to criticize the terminological vocabularies (though it was not like that at all) and, being hurt, would not let this paper to be published. So it was published, after overcoming a lot of obstacles, only in 1989 in a book of collected articles addressed only to medical information officers [24].

In this paper the term "READERS HANDLING SCIENTIFIC PERIODICALS" was proposed for designation of all kinds of readers activity directed to orientation in periodical materials, their search, finding and further (potential) reading, of the acquaintance with and looking though a periodical. I think, we may discuss the term itself, but it does seem obvious that it is necessary to coin some short term with this meaning.

Table 3. The terms used in some of bibliometric literature for designating all kinds of readers activity directed to orientation in periodical materials, their search, finding and further (potential) reading: their vocabulary definitions and comments on insufficiency of their being used in the mentioned generic sense.

A misused term	Its recognized meaning and the reference	Comments
"Information request"	The text written in a natural language expressing a certain information need [5, p. 165]	Obviously non-relevant meaning: it may bear no relation to the readers activity under analysis
"Readers demand"	The need of [all kinds of the] readers in [all kinds of] the literature addressed to a library. It may be divided in a certain one (concrete or thematic) and to an uncertain one [23, p. 168]	Too general in terms of literature kinds, too specific in terms of addressing to exactly a library. The output of documents is not implied. Uncertain demands are not characteristic for the scientists activity under analysis
"Use of a library stocks"	The consumption of the documents presented in a library stocks for ideological, scientific, information-and-bibliography as well as for general educative work. The major indicators are books output and books turnover [23, p. 59-60]	The consumer may be a librarian, a politician etc. The aim of "consumption" is not specified as research work. Too specific indicators. In general, the definition is not correct as telling nothing of what the nature of such "use" is: "consumption" and "use" is just the same. The older definition (see column 2) is of more logics.
"Books output"	"Presenting to the readers of a library and to librarians the printed documents for..." [and so on ad literum as in the previous one] [25, p. 58]	The same comments except the last remark
"Books output"	The number of the documents delivered to the readers in accordance with their requests [23, p. 68]	Too narrow meaning.

STRUCTURE OF REFERENCES AS A POSSIBLE AID OF THE ASSESSING THE POTENTIAL VALUE OF CITING PERIODICALS

If citedness denotes the actual use which is more adequate indicator of value, the readers addressing to periodicals denotes a POTENTIAL use, being therefore an indicator of potential value, or, if avoiding the term "potential", being the less precise indicator of value.

However, besides evaluation of periodicals according to their CITEDNESS figures, there are studies of the assessment of periodicals in accordance with the structure of references in them, i.e. the of the assessment of CITING (not cited) periodicals. (SCI Journal Citation Reports for example has a special section devoted to these figures). The structure of references IN periodicals may also tell something about the (citing) periodicals properties, but there is rather a limited number of papers devoted to this problem (e.g. [2832]) which are fulfilled on the basis of a very common sense.

Reconstructing the problem of a property, reflected in such studies, ab ovo I am to tell that the POTENTIAL VALUE of a scientific document that is just being created (so, not yet being used neither being addressed to, but having already references to the documents used while it is being created) is predetermined by the conditions of the creation [7, p. 113], while, possibly, the most important ones are the information conditions. They are called "cognitive basis" [28, p. 16] of a research, which is reflected in the structure of the references in a CITING paper describing its results [28, p. 16]. Thus, if we "decipher" this structure, we can assess the POTENTIAL VALUE OF CITING PAPERS (that might enable one to have a most rapid, almost immediate assessment).

However, such assessment is too much rough, because: 1) the stochastic nature of such assessment is far more stronger than in case with cited papers; 2) therefore, such an approach is absolutely useless when applied to a single paper or to small amounts of them and might be good only for the sufficient collections of papers (so, not so bad as applied to exactly periodicals?); 3) in contrast with the assessment of cited papers, where a more number of citations normally stands for their better value, in this case it is required to find out various indicators of STRUCTURE of references, to determine their meaning and to estimate the "standard" magnitudes for comparison.

The problem of "deciphering" the references structure in CITING periodicals for the assessment of their potential value is still a great challenge [29; 30]. And the problem of the "standard magnitudes" is only meeting some very first approaches that just seem reasonable [31]. However, we can try to designate a PROPERTY of a CITING periodical, reflected by CITING REFERENCES STRUCTURE as POTENTIAL VALUE -- "much more potential" that the one reflected by readers addressing to periodicals, because the notion of the value is not yet in the content of any -- even potential -- USE of periodicals, but only determined by the inner structure of the articles, which is determined by the documents used by their creators. (This factor IS important, but it is not the only one.)

#### SCIENTISTS ATTITUDE TO PERIODICALS EXAMINATION: QUALITY IS EVALUATED, ALL THE REST IS TEA-LEAVES READ

The forth group of methods is quantitative processing of the data of questionnaire surveys, interviews, peer assessing and other possible methods of evaluation of scientists ATTITUDE to periodicals. In contract with the methods of previous groups which reflect either directly a concrete property itself (productivity) or an intermediate of a property as a process existing in objective reality (use as an intermediate of value), the methods of this group reflect only OPINIONS that seems to be less reliable intermediate than a piece of objective reality. Of course, it is much possible to put questions to the peers, responders etc. about value, "impact" and even productivity, but what is the reason?.. The value is more "directly" assessed through the use data than through the opinions data, the latter rather being immanently closer to the

notion of the "quality" (see Table 1), while the productivity is being measured either directly (de visu count) or almost directly. It is a tempting idea to assess the IMPACT by these methods, but the idea does not seem not to be developed enough as yet to explore it fruitfully. Of course, the notion of the impact as of influence or a strong impression seems to be fairly identifiable though opinions -- in contract with value, but, again, it is still the point of further consideration.

Also, there are, of course, some properties of scientific periodicals that do exist as an objective reality and that we cannot quantitatively evaluate in a way other than studying opinions. For example, we are able to say that scientific periodicals have such property as "attractiveness" -- by analogy with "attractiveness" of a piece of art [32, p. 38--39], which is determined by such factors like format of a periodical, cover design and other external factors affecting on subjective liking. However, such properties are hardly the ones of any importance in the content of the assessment of the ability of periodicals to correspond to the information needs of a domain.

Sometimes the USE is also evaluated through the methods of the forth group [33]. It is well-known, however, that some experts tend to exaggerate the scope of their use of such periodicals that were their favorite ones in the days of the beginning of their scientific carrier, that they pretend to demonstrate more number of periodicals that they really regularly use [36, p. 294] etc. (But how could they remember? Their memory relates to READING rather than to the actual use.) Such details, to tell the truth, are anyhow of no importance: citation analysis also has some recognized "demerits", but citation analysis is an aid of evaluation the use itself, while in the case under consideration only opinions about the use are under study. Again, as it was demonstrated above (Table 1), the analyzed approach is IMMANENTLY matching for QUALITY evaluation.

#### THE NEED IN A RECOGNIZED TERM TO DENOTE THE GENERAL ABILITY OF PERIODICALS TO CORRESPOND TO THE INFORMATION NEEDS OF A DOMAIN

It seems almost undoubtedly that some specific properties of scientific periodicals (other than productivity and value) that also determine the ability of the latter to correspond to information needs of a concrete domain representatives exist; the problem is that our methodic arsenal does not make us possible to evaluate them. On the other hand, some of the specific methods bring a mixed notions of productivity and value of periodicals (like some varieties of readers addressing to periodicals examination). So, the generalized term for designation of the the ability of periodicals to correspond to information needs of a concrete domain representatives should be coined to avoid misunderstandings in complicated situation and to be used in generic sense. In fact, a lot of terms were arbitrary used for such purpose, but this use was not regulated at all as in case with specific properties nominations. In 1981 I at first used the conditional term "thematic orientation of a scientific periodical" [34] in the mentioned generic sense, in 1983 I published a special paper called "Quantitative assessment of thematic orientation of scientific periodicals" which aim was to ground the necessity in a special term with the above meaning, and to coin this term [35]. However, I have not succeeded and just a couple of authors followed me in the terminology. Possibly this term did not sound good; however, my objective now is again to demonstrate the necessity in such a term for the further stimulation of the quantitative assessment of the properties of scientific periodicals. \*

This paper is a part of ongoing study which concept was developed with the kind assistance of Professor V.M. Motylev (St.-Petersburg, Russia), Professor Ona Voverenye (Vilnius, Lithuania) and Dr. Galina Abrlyeva (St.-Petersburg, Russia).

Endnote:

(\*) References are omitted in order not to overload the referencelist. The examples are taken from the articles, devoted to the results of periodicals quantitative evaluation, that I collected in 1978-86.

References:

1. [P.L.K. Gross, E.M. Gross, College libraries and chemical education, Science, 66 \(1927\) 385-389.](#)
2. [S.C. Bradford, Sources of information on specific subjects, Engineering, 137 \(1934\) 85-86.](#)
3. S.D. Khaitun, *Scientometrics*, Nauka, Moscow, 1983. (in Russian)
4. [G. Hirst, Discipline impact factor: a method for determining core journals lists, Journal of American Society for Information Science, 29 \(1978\) 171-172.](#)
5. *Dictionary of the Terms of the Information Science*, International Center for Scientific and Technical Information, Moscow, 1975. (in Russian, with the applied lists of terms in 13 more languages)
6. L. Salmi, *Citation analysis and impact factor*, Newsletter to European Health Libraries, N 28 (1994) 17-18.
7. V.A. Minkina, *Investigations of documentary flows for assessment the characteristics of value of technical literature*; in: *Documentary Flows on Natural Sciences and Technology and Bibliographical Problems: Collected Papers*, Leningrad, 1983, p. 111-122. (in Russian)
8. A.I. Mikhailov, A.I. Chernuiy, R.S. Gilyarevskiy, *Scientific Communications and the Information Science*, Nauka, Moscow, 1976. (in Russian)
9. *Philosophical Dictionary*, Politizdat, Moscow, 1972, p. 453. (in Russian)
10. L. M. Tolchinskaya, *Criteria for the [documents] selection for library stocks formation*, *Sovetskoye bibliotekovedeniye*, N 3 (1985) 47-54. (in Russian)
11. Brokgauz - Efron, *Philosophical Dictionary: Logic, Psychology, Ethics, Aesthetics and the History of Philosophies* / Ed. by E.L. Radlov, Sankt-Petersburg, 1904. (in Russian)
12. *Websters's Desk Dictionary of the English Language Based on the Classic Edition of the Random House Dictionary*, Portland House, New York, 1993.



13. Webster's New Twentieth Century Dictionary of the English Language. Unabridged. 2nd ed., The World Publ. Co., Cleveland and New York, 1968.
14. Dictionary of Political Economy / Ed. by R.H.I. Inglis Palgrave. Vol 111, MacMillan and Co., Ltd., London, 1901, p. 606.
15. Encyclopedia Britannica, Vol. 18, William Benton Publ., Chicago London - Toronto - Geneva - Sydney - Tokyo - Manila, 1969, p. 915.
16. J. A. Virgo, A statistical procedure for evaluating the importance of scientific papers, *Library Resources and Technical Service*, 47 (1977) 415-430.
17. [S. M. Lawani, A.E. Bayer, Validity of citation criterion for assessing of scientific publication: new evidence with peer assessing, \*Journal of American Society for Information Science\*, 39 \(1983\) 5966.](#)
18. S.G. Kara-Murza, Citation in science and approaches to the assessment of scientific impact, *Vestnik AN SSSR*, N 5 (1981) 68-75. (in Russian)
19. Encyclopedia Britannica, Vol. 16, William Benton Publ., Chicago London - Toronto - Geneva - Sydney - Tokyo - Manila, 1969, p. 548.
20. [P.A.Scales, Citation analysis as indicator of the use of serials: a comparison of ranked titles lists produced by citation counting and from the use data, \*Journal of Documentation\*, 32 \(1977\) 17-25.](#)
21. [Ch. B. Wenger, J. Childress, Journal evaluation in a large research library, \*Journal of American Society for Information Science\*, 28 \(1977\) 293-296.](#)
22. [S.N. Dhawan, S.K. Phul, S.P. Jarn, Selection of scientific journals: a model, \*Journal of Documentation\*, 36 \(1980\) 24-32.](#)
23. *Librarianship: Terminological Dictionary*, Moscow, Kniga, 1986. (in Russian)
24. V.S. Lazarev, Readers handling scientific periodicals as an indicator of periodicals thematic orientation; in: *Methodological Problems of Medical Information Science and the Science of Science in Medicine: Collected Papers*, Moscow, 1989, p. 173--186. (in Russian)
25. *Vocabulary of Library Terms*, Kniga, Moscow, 1976. (in Russian)
26. N.V. Martynova, L.V. Volynskaya, N.A. Ponomareva, G. N. Abelyeva, I.B. Nechueva, Formalized analysis of scientific medical information carriers; in: *Proceedings of the 2nd All-Union Conference of the Historians of Medicine: Results and Perspectives in Scientific Medical Information and the Science of Science*, Tashkent, 1980, p. 32-33. (in Russian)



27. A.R. Uvarenko, V.V. Koblyanski, O.N. Litkevich, N.A. Skidan, The study of bibliographical activity of major sources of documents; in: *Cybernetics and Information Science in Medicine: Collected Scientific Papers*, Riga, 1983, p. 223-228. (in Russian)
28. S.A. Rozhkov, S.G. Kara-Murza, Structure and age of bibliographic references as an indicator of scientific potential; *Nauchnotekhnicheskaya informatsiya. Ser.1. N 4* (1983) 16--18. (in Russian)
29. V.S. Lazarev, G.P. Gordiyenko, G.A. Karas, L.L. Poverznyuck, D.K. Dosmagambetova, R.K. Ulybayeva, D.A. Yunusova, B.G. Yusupova, Z.I. Khodzhabayeva, R.B. Rysakhova, Towards the method of rapid assessment of scientific activity of scientific research institutions. Part 2; in: *Voprosy bibliografovedeniya i bibliotekovedeniya [Problems of Bibliography Science and Librarianship; annual]*, Universitetskoye Publishers, Minsk, 15 (1994) 136-148. (in Russian)
30. V.S. Lazarev, Bibliometric references as the aid of assessment of scientific value of CITING papers; in: *Health Information for global village: Proceedings of the 7th International Congress on Medical Librarianship*, Washington, D.C., May 10-12, 1995 / Ed.: EveMarie Lacroix, Local Organizing Committee 7th International Congress on Medical Librarianship, Washington, D.C., 1995, p. 276--277.
31. V.S. Lazarev, D.A. Yunusova, Towards the method of rapid assessment of scientific activity of scientific research institutions. Part 3; in: *Voprosy bibliografovedeniya i bibliotekovedeniya [Problems of Bibliography Science and Librarianship; annual]*; Univer sitetskoye Publishers, Minsk, 16 (1995) 64--79 (in Russian)
32. E. Ion, Some theoretical problems of aesthetic education; in: *Modern Progressive Aesthetical Thought*, Nauka, Moscow, 1974, p. 35--53. (in Russian)
33. W.A. Satariano, Journal use in sociology; citation analysis versus readship patterns, *Library Quarterly*, 48 (1978) 293--300.
34. V.S. Lazarev, Analysis of bibliographical citations as a method of selection thematically oriented periodicals, *Naucniuye i tekhnicheskiye biblioteki SSSR*, N 5 (1981) 27-34. (in Russian)
35. V.S. Lazarev, Quantitative assessment of thematic orientation of scientific periodicals, *Naucniuye i tekhnicheskiye biblioteki SSSR*, N 3 (1983) 22-29. (in Russian)