

Net Impact Factor and Immediacy Index of ten frontline ISI journals: A case study based on citations to in-press or unpublished articles

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The transmission of scientific discoveries to the scientific world is central to the progress of science. The carriers of discoveries are predominantly the journals. Journals intermediate in the knowledge transmission around the world [Sarasvady and Pichappan, 2001]. Impact Factor (IF) and Immediacy Index (II) devised by Institute of Scientific Information (ISI), Philadelphia are based on quantifiable statistical data that provides a systematic, objective way to evaluate the world's leading journals and their impact and influence in the global research community [ISI, 2006]. When Impact Factor decides the impact of a journal being made on the scientific community in terms of citations, Immediacy Index (II) decides how immediate the impact was. These two factors decide where the journals stand among ISI journals and compared. Sometimes, these are becoming the competitive criteria among ISI journals. Both these indicators can be obtained from *Journal Citation Reports* (JCR) published by ISI every year for more than 5000 selected science journals. The calculation of both these measures for a particular year is based on the number of citations in that year to the articles published by the journals in the previous two years and in the same year.

The citations to the articles which are not published and in-press are not considered towards the total citations to a journal by ISI for calculating both Impact Factor and Immediacy Index. Garfield [2005], a pioneer in the field, has clarified through one of his personal correspondence that they are not unified as a variant and therefore are not counted towards any year in the JCR.

If the ISI had added these citations to the journals cited, the variation in impact and immediacy factors could be much more than what is being published in JCR at least for some journals to which the number of citations to in-press or unpublished articles are very high. But this is not possible because the absence of year of publishing in the

reference. The study has made efforts to identify some journals, from which many ‘in-press’ or ‘unpublished’ items are highly cited and find out, if they had counted for a particular year in JCR, how much net effect they can make on Impact Factor and Immediacy Index of those journals.

Materials and Methods

CD-ROM version of *Science Citation Index* (1995-2004) of ISI is made use of to elicit citations to the ‘in-press’, and ‘unpublished’ articles from the journals of study. The tradition of ISI treating the citations to unpublished items where no year is specified in the ‘Cited Author/Reference’ field of *Science Citation Index* is described as follows with an example:

Eg. ROTH-R-0000-INPRESS-PHYS-REV-LET

In this example, one *Physics Review Letters* article in-press of ‘Roth, R.’ has been cited and instead of the usual year of publication of the item cited, ISI used the string ‘0000’ instead of year of publication, because of the unavailability of the same. The work has taken into consideration the citations to such ‘in-press’ and ‘unpublished’ articles where year has not been specified but title of the journal is present.

Impact Factor and Immediacy Index of the journals considered for the present study for the year 2004 are noted from the CD-ROM version of *Journal Citation Reports* of ISI.

Results and Discussion

Highly cited journals by their unpublished articles

The first step of the study was to identify the journals from which unpublished or in-press articles have been heavily cited. There were around 1, 20,000 records in *Science Citation Index* for the period 2002-2004, where unpublished or in-press articles have been cited. *Physical Review B; Journal of Chemical Physics; Physical Review D; Physical Review Letters; Journal of Applied Physics; Physical Review E; Langmuir; Journal of the American Chemical Society; Journal of Applied Polymer Science; and Journal of*

Biological Chemistry are the top ten journals from which majority of the unpublished or in-press articles have been highly cited. These top ten journals are again taken into consideration for the further analysis. Citations to the unpublished or in-press articles of these journals are elicited for a period of ten years (1995-2004) from *Science Citation Index*. Because of the unavailability of the year of publication, either average or minimum number of citations can certainly be added to the calculation for the Impact Factor or Immediacy Index of those journals during these ten years period, Table 1 is the list of the top ten journals along with their number of citations to their unpublished or in-press articles. The minimum number of citations received during the ten years period is marked as bold.

Journal Title	Cited year									
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<i>Physical Review B</i>	848	945	849	675	693	681	634	549	457	381
<i>Journal of Chemical Physics</i>	821	831	747	585	607	504	410	389	339	271
<i>Physical Review D</i>	237	235	269	349	351	520	398	352	290	367
<i>Physical Review Letters</i>	599	484	520	609	499	556	565	443	523	435
<i>Journal of Applied Physics</i>	364	428	356	298	352	347	303	312	268	172
<i>Physical Review E</i>	215	270	246	224	186	217	210	223	170	134
<i>Langmuir</i>	207	253	223	206	245	281	170	194	161	130
<i>Journal of the American Chemical Society</i>	474	545	428	377	349	304	273	227	236	180
<i>Journal of Applied Polymer Science</i>	150	201	167	152	216	209	228	196	201	145
<i>Journal of Biological Chemistry</i>	157	155	127	120	118	136	217	143	144	120

Table 1: Ten high ranking journals of ISI with the number of citations to unpublished or in-press articles during 1995-2004 as per *Science Citation Index* (minimum number of citations received are made as **bold**)

Modified Impact Factor

As described in introduction, the citations to the in-press' or 'unpublished' articles can not be credited to the citations to a journal for a particular year because of the unavailability of the year of publication of these articles. In the later analysis of the present study it has assumed that there can be a minimum number of citations due to the above fact which have to be added to the numerator for the calculation of ISI Impact Factor in every year. The minimum number of citations to 'in-press' or 'unpublished' articles from the ten journals during 1995-2004 are elicited and documented in Table 2.

The JCR Impact Factor – 2004 and the modified Impact Factor after adding the minimum number of citations to the numerator for the calculation of JCR Impact Factor – 2004 is also documented in the same table. The minimum number of citations to the ‘in-press’ or ‘unpublished’ articles could make an average growth rate of 102.73 % in the JCR Impact Factor of these ten journals. Accordingly there would be a jump in their rankings among the ISI journals based up on Impact Factors. In other words, there would be a chance of discussion on the real impact they make on the scientific community and the comparison with the competing journals. Also there is no correlation observed between the rank of the top ten journals and the corresponding existing impact factors.

Journal Title	Min. no. of citations	* JCR IF ₂₀₀₄	Modified IF	% growth
<i>Physical Review B</i>	381	3.075	3.150	102.44
<i>Journal of Chemical Physics</i>	271	3.105	3.211	103.41
<i>Physical Review D</i>	235	5.156	5.267	102.15
<i>Physical Review Letters</i>	435	7.218	7.365	102.04
<i>Journal of Applied Physics</i>	172	2.255	2.309	102.39
<i>Physical Review E</i>	134	2.352	2.406	102.30
<i>Langmuir</i>	130	3.295	3.378	102.52
<i>Journal of the American Chemical Society</i>	180	6.903	6.967	100.93
<i>Journal of Applied Polymer Science</i>	145	1.021	1.111	108.81
<i>Journal of Biological Chemistry</i>	118	6.355	6.373	100.28

(JCR IF = Journal Citation Reports Impact Factor)

Table 2: Highly cited ISI journals by their unpublished or in-press articles as per *Science Citation Index* (1995-2004) with their JCR Impact Factor – 2004 and modified Impact Factor

Modified Immediacy Index

Because of the same reasons described above, there can be a change in the case of Immediacy Index also. Similar to Table 2, Table 3 contains the minimum number of citations received to the unpublished or in-press articles from the top ten journals with the Immediacy Index published in JCR – 2004, the modified Immediacy Index, and the percentage of increase. There is an overall average percentage growth of 126.83 %.

More unpublished or in-press articles are getting cited from a journal implies that faster research in the area of scope of the journal is going on. Immediacy Index is nothing but

the measure for the fact of how immediately the literature from the journal is used by others. In the present study, in contrary to the above fact, there is no much correlation observed in case of Immediacy Index with the ranks of the top ten journals in the present study.

Journal Title	Min. no. of citations	* JCR II ₂₀₀₄	Modified II	% growth
<i>Physical Review B</i>	381	0.607	0.760	125.2
<i>Journal of Chemical Physics</i>	271	0.704	0.900	127.8
<i>Physical Review D</i>	235	1.615	1.821	112.7
<i>Physical Review Letters</i>	435	1.603	1.846	115.1
<i>Journal of Applied Physics</i>	172	0.383	0.511	133.4
<i>Physical Review E</i>	134	0.425	0.543	127.7
<i>Langmuir</i>	130	0.566	0.717	126.6
<i>Journal of the American Chemical Society</i>	180	1.343	1.456	108.4
<i>Journal of Applied Polymer Science</i>	145	0.195	0.367	188.2
<i>Journal of Biological Chemistry</i>	118	1.250	1.286	102.8

(JCR II = Journal Citation Reports Immediacy Index)

Table 3: Highly cited ISI journals by their unpublished articles as per *Science Citation Index* (1995-2004) with their JCR Immediacy Index – 2004 and modified Immediacy Index

Conclusion

Impact Factor devised in 1960s and Immediacy Index in 1975, have evolved into shorthand measures of the quality and prestige of a particular journal [Leff, 2005]. They are used for ranking of quality of journals and extensively by leading journals in their advertising. Since journal impact factors are so readily available, it has been tempting to use them for evaluating individual scientists or research groups. The increasing awareness of journal impact factors, and the possibility of their use in evaluation, is already changing scientists' publication behaviour towards publishing in journals with maximum impact, often at the expense of specialist journals that might actually be more appropriate vehicles for the research in question. Certainly, there is a competition among the editors of journals to increase the prestige of a journal somehow especially through a good impact factor and immediacy index.

This case study may be used by the editors of at least the ten journals to claim net impact they are making on the scientific community. The results can certainly be used where ever they are competing with their nearby ranked journals.

The modified ranks based on both impact factor and immediacy index can be done only if the process has been extended to all the ISI journals listed in *Journal Citation Reports*.

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