



Citation Impact

Recently, I traveled to Asia, where I learned that a young faculty member of a prominent university was receiving an early promotion because he had published three papers in an IEEE journal that had a very high impact factor (IF) in Thomson Reuters' *Journal Citations Reports*. Some schools publish a list of journals, indicating whether or not their faculty should publish based on the IF. One esteemed European colleague, who took a high-level university position, told me that his university consults IFs in determining strategic funding sources distributions for different disciplines. Not surprisingly, many national funding agencies are practicing the same.

So, what is the IF of a journal? It is simply Y/X , say for year 2011, where X is the total sum of the numbers of papers published by a journal in years 2010 and 2009 (a two-year window) and Y is the citations to these papers in 2011 from the journals and some selected premier conferences indexed by Thomson Reuters.

There are some journals with IFs near 100. Some well-known and respected journals such as *Science* and *Nature* consistently have IFs of 30+. In the category of "Engineering–Electrical and Electronic," where most of our journals are listed, one will be proud to find that *IEEE Signal Processing Magazine (SPM)* tops the list of 247 journals with an IF of 6.0. In fact, *SPM* has had the highest IF three times in this category. Many of our journals are doing very well, with five among the top 21 in 2011.

What does an IF mean? It can be interpreted as how influential and timely a journal is. An IF=6 basically means that on average, a paper published in the past two years was cited six times. Most IEEE

journals have IFs in the range of 1.0 to 3.0. Is this good enough? Think about it this way: With all the effort that goes into getting a paper published, it is likely to be read and cited by others only one to three times in the next two years. Doesn't this prompt us to ask if an IEEE paper is relevant enough?

In fact, if one digs into the citation data and measures a five-year period (i.e., the five-year IF), many of our journals have higher values. For example, *SPM's* five-year IF is 7.043 and *IEEE Transactions on Image Processing* jumps from IF=2.918 to five-year IF=4.205. Compare that to the IFs of *Science* and *Nature*—their IFs are almost the same as their five-year IFs. What does that tell us? Typically, these journals review and accept a paper in two to three weeks with a very high rejection rate. How long do we take?

Long ago, when I was the vice president, Publications, I recalled most of our journals having a backlog of ten to 12 months. In other words, after going through many long months of review to finally become accepted, a paper could wait for yet another 10–12 months before it was published. It took us three years and a lot of money to flush all the papers out of the queue, and we now have a zero-queue policy, meaning that when a paper is accepted, it goes to production immediately. The entire process from submission to publication is now six to nine months. But is this good enough?

Some may argue that given the nature of our field, e.g., long papers with many theoretical derivation and equations, further compression of review time may not be a good thing. But we need to make sure that our review is of high quality and is also timely. Our past culture of dragging out the review forever pulled us down when it came to the timeliness of a paper's content.

In fact, for a journal to be well cited, the field needs to have many journals

and conferences that publish papers that cite each other. A study carried out by Alex Acero showed that the average number of papers cited by an ICASSP paper is 8.84, while that of ICCV is 30.17; and that of *IEEE Transactions on Signal Processing*, *IEEE Transactions on Image Processing*, and *IEEE Transactions on Pattern Analysis and Machine Intelligence* are 17.45, 33.09, and 52.32, respectively. If one consults the IFs of these journals, one can conclude that they rank proportionally according to the references cited!

Citation to prior arts is no doubt an important element of research methodology. Aren't we dwarfs standing on the shoulders of giants? And whether we like it or not, the reputation of a journal is being quantified by its IF, and so is the scientific field. Besides our professional judgment of quality, the IFs of our journals also reflect the quality of our field to others. In a certain sense, the IF is a metric that democratizes the myth of ivory tower publications!

I remember a conversation I had with a postdoctoral fellow at the National Institutes of Health who was looking forward to being a faculty member in biochemistry. He told me that he needed to publish at least three papers in journals with IFs higher than 15 for him to have a chance of landing a faculty position. He asked me what IFs are in my area. I struggled to explain to him as he stared back at me in disbelief...

If we claim to be in a field that is ground breaking and life changing—that has enabled the cellular phone, high-definition television, and the iPod/iPad—then why doesn't our IF reflect that and speak for itself?