End-to-end performance analysis of CSIR in SIR 2014

The latest (2014) version of the SCImago Institutions Rankings (SIR) report has just been released online in an entirely new format. For reasons not fully understood, only ranks are given and no more raw data. This has made tertiary performance evaluation extremely difficult (assuming that the SIR itself is a secondary evaluation exercise using primary bibliometric data from SCOPUS) and only indirect surrogate indicators can be computed. An attempt is made here to use the new arrangement of data to see the time evolution of leading CSIR institutions over a six-year window (2009–2014). Here we shall look only at the lists in SIR which are based on research indicators. One new feature that has been introduced is called the Scientific Talent Pool (STP). It is the total number of authors from an institution in the total publication output of that institution during a particular period of time. This indicator is size-dependent and is a measure or proxy of the input that goes into scientific research activity.

Here we shall look at only those CSIR institutions which appear continuously in all the report years from 2009 to 2014. For each of these years, the data used to generate the indicators covers a five-year period; thus, in the report for the year 2014 the results used are those for the five-year period 2008–2012. Further, the indicators have been normalized on a scale of 0 to 100 with the top institution having the 100 grade. In each year, only those institutions that have published more than 100 scholarly articles indexed in the SCOPUS database during the last year of the period of time are counted. Only 18 out of the 38 constituent laboratories of the CSIR make this cut. CSIR as a whole is counted as a 'parent' institution and the 18 'children' are listed separately.

In the present analysis we shall look at only two output dimensions, inspired by the Aristotelian categories of quantity and quality. First, we look at the quantity or size dimension: This is the number of articles published during the five-year window, normalized on the 0–100 scale. We indicate this normalized quantity indicator by Q. For this entire cycle from 2009 to 2014, the Centre National de la Recherche Scientifique (CNRS) of France was listed as the top ranking institution in the world with the score of 100. The second dimension is quality. SIR gives several field-normalized size-independent indicators which are in varying ways proxies for this but we shall restrict attention to only one – Excellence Rate, which is the proportion (in percentage) of an institution's scientific output that is included into the set of the 10% of the most cited papers in their respective scientific fields and is a measure of high quality output of research institutions. Again, for each year, these values are normalized so that the highest ranking performer has a score of 100. The first position has changed hands during the 2009 to 2014 period: the Broad Institute of MIT and Harvard occupied the top rank with an Excellence Rate score of 100 in 2009 and from 2012 to 2014, while the Whitehead Institute for Biomedical Research was credited with the 100 score in 2010 and 2011. We indicate this normalized quality indicator by q.

As already mentioned, we adopt one size-dependent input indicator, the so-called STP which is the total number of authors from an institution in the total publication output of that institution during a particular period of time as a meaningful measure of the input into research activities. This is also normalized in the same manner as above and again for the period from 2009 to 2014, CNRS of France was listed as the largest institution in the world with the score of 100. We indicate this normalized input indicator by STP.

For a single-valued composite outcome indicator, we computed the second-order indicator called the exergy term from the quantity and quality indicators, $X = q^2Q$. Productivity is then computed as X^2/STP and this becomes a plausible performance indicator. We thus have an end-to-end performance analysis: input–output–excellence–outcome–productivity according to the following scheme: Input, STP; Output, O = Q; Excellence, Exc = q; Outcome, $X = q^2Q$; Productivity, X/STP.

Table 1 lists this surrogate measure of productivity for the two 'parent' agencies, CSIR and CNRS and the 18 'daughter' institutions of CSIR that make the cut for all six years from 2009 to 2014. We see that CNRS as a whole maintains a productivity indicator that is larger than CSIR's, increasing from 2.1 to 2.8 times that of CSIR's during the period. CSIR has also been declining faster: by 2014 CSIR has dropped to 63.23% of the value in 2009. During the

Table 1. Surrogate proxy for per capita scientific productivity of CNRS, CSIR and several CSIR institutions

Abbr. name	X^2/STP (Exergy/Scientific Talent Pool)						
	2009	2010	2011	2012	2013	2014	Slope
CSIR	515.4	494.7	424.4	379.7	332.8	325.9	–42.22
CSMCRI	2134.1	1918.5	1508.9	1010.7	732.7	757.9	–312.47
NIIST	1622.6	1797.2	1297.6	1298.8	1038.2	887.3	–170.07
NCL	996.1	853.4	675.8	538.6	391.2	430.6	–124.33
CECRI	803.3	788.1	674.8	512.2	410.0	322.5	–105.74
CFTRI	526.2	512.4	384.9	238.2	186.2	124.4	–89.56
NML	813.9	708.9	461.1	432.6	369.8	419.8	–86.17
IICT	718.3	592.2	521.5	438.0	373.8	348.4	–73.95
CCMB	434.3	418.4	288.4	228.4	234.4	198.6	–51.17
NBRI	505.5	445.2	364.0	345.6	283.6	278.4	–46.82
CLRI	390.9	332.4	271.6	301.7	271.0	264.8	–22.43
NIO	125.7	120.4	139.3	128.0	125.8	134.3	1.36
IICB	177.0	185.5	176.3	214.6	206.8	231.2	10.67
NGRI	104.0	105.8	125.0	140.6	130.2	166.3	11.44
CDRI	243.7	233.6	258.0	281.6	295.2	294.5	13.22
NEERI	164.2	258.0	334.5	325.1	325.9	268.6	20.47
NPL	537.3	840.0	798.9	786.2	752.2	767.1	24.95
IGIB	224.7	311.8	348.2	336.9	333.1	389.8	25.09
IITR	445.9	421.8	429.2	515.9	721.8	831.6	83.29
CNRS	1085.7	1036.2	942.5	906.0	891.0	908.4	–38.81

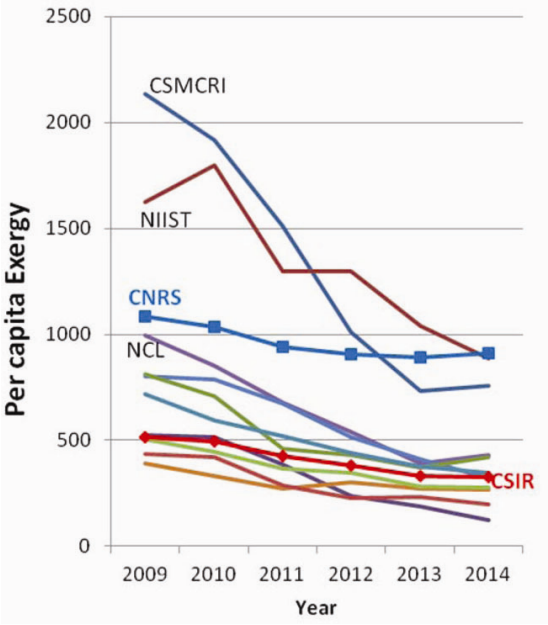

Figure 1. The ten laboratories of CSIR that show relative progress.

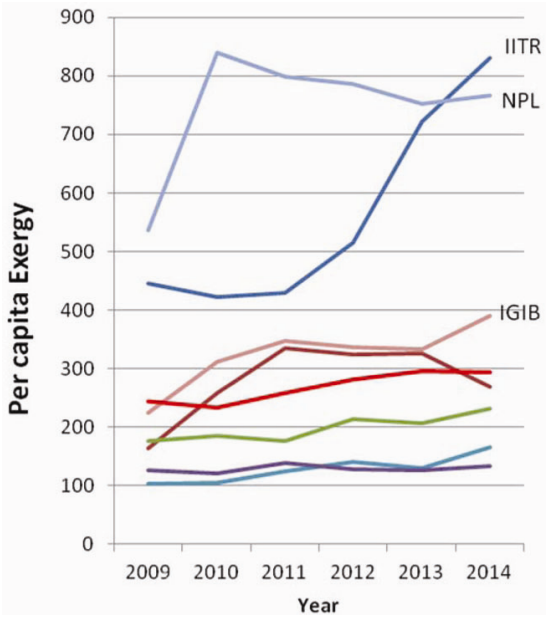

Figure 2. The eight laboratories of CSIR that are in relative decline.

same time CNRS has declined to only 83.67% of its 2009 value in 2014. Note that these relative declines have to be rationalized in terms of the very high standards set by the Broad Institute of MIT and Harvard which occupied the top rank with an Excellence Rate score of 100 in 2009 and from 2012 to 2014, and the Whitehead Institute for Biomedical Research which was credited with the 100 score in 2010 and 2011. The SLOPE function available in Excel is used to compute the progress or decline of the various institutions and this is shown in the last column in Table 1. Ten of the CSIR institutions are in decline while eight show steady or good progress. Figure 1 displays the trajectories of the two groups with the prominent laboratories labelled. We see that the premier Chemistry-based laboratories are in rapid decline. The Biology laboratories are registering relatively good progress (Figure 2). For good measure, the results for CSIR and CNRS as a whole are also included as a benchmark.

1. http://www.scimagoir.com/; accessed between 15 and 24 August 2014.

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Human–animal conflicts

At the outset, *Current Science* must be lauded for publishing papers linking science and society. And in these days of human–animal conflicts, publication of reports on dog–human relationship is timely[1,2].

This author's association with about a dozen breeds of pet dogs and over several hundred free-ranging native dogs started over 60 years ago first in Bangalore (where he was born and brought up until about 12 years of age) and then in New Delhi for substantial part of his life, and now in Chennai since 1999. In all these places, this author has always had pet dogs at home and also cared for scores of free-ranging native dogs. His understanding of their behaviour based on years of observations at home and outside is that dogs inherently are neither 'submissive' nor 'aggressive', but just adaptive to suit the circumstances. Often dogs which wag their tails and 'beg' for food or crave for love and attention can also become aggressive under provocation. At home, this author's pet Deutschund 'Pinky' would jump on his bed at midnight and push him to the other side so that she could be right under the fan. If chided, she would either bark and exercise her authority or jump out of the bed and sulk. These different behaviourial patterns probably reflect her moods similar to those of humans.

There is a strong hierarchy among a group of free-ranging dogs, a tradition preserved from their progenitors, the wolves. The domestic dogs originated from European wolves that interacted with human hunter-gatherers between 18,000 and 32,000 years ago. That was quite a long time before humans made the transition from hunting and gathering to cultivation of crops and domestication of farm animals. Hence, the humans today should not forget the long-standing evolutionary binding.

Majumder *et al.*[1] have concluded that the solution to the dog–human conflicts is not culling, but efficient 'garbage management' and a 'positive attitude' towards dogs. While agreeing with the authors, it should be ensured that 'garbage management' does not, however,