India's share of world research according to Science and Engineering Indicators 2018

The 2018 report of Science and Engineering Indicators[1] shows that China and India continue to rise, while the developed economies seem to slow down, as shown in these pages earlier[2–6].

Appendix table 5-27 of Science and Engineering Indicators compiles science and engineering (S&E) articles in all fields, by region/country/economy for the period 2003–2016 using a fractional count basis. Appendix table 6-3 arranges the Nominal GDP, again by region/country/economy for the period 2001–2016 in terms of millions of current dollars. These data can be rearranged as shown in Figure 1, so that the world share of publications can be plotted against the world share of nominal GDP. There is linear scaling effect between these two indicators – the higher the share of GDP, the higher is the S&E output (Figure 1).

Figure 1 shows the trajectories of various regions and countries over the period 2003–2016. USA, EU and Japan continue to slow down. China and India show steady progress.

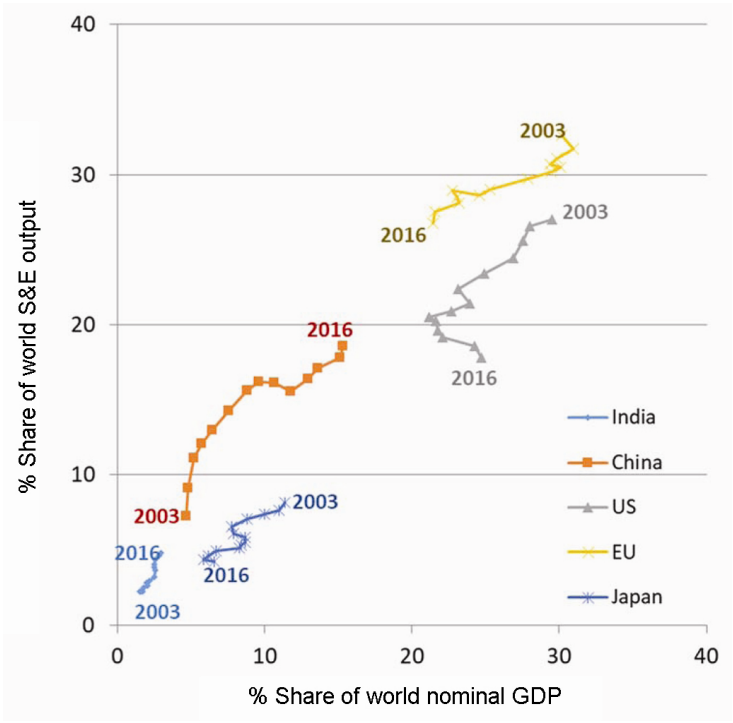

Figure 1. Trajectories of various regions and countries from 2003 to 2016 as world share of publications plotted against the world share of nominal GDP – the higher the share of GDP, the higher the S&E output.

1. https://www.nsf.gov/statistics/2018/nsb20-181/assets/nsb20181.pdf (accessed on 19 January 2018).
2. Prathap, G., *Curr. Sci.*, 2008, **94**, 1113.
3. Prathap, G., *Curr. Sci.*, 2010, **98**, 1160–1161.
4. Prathap, G., *Curr. Sci.*, 2012, **103**, 351–352.
5. Prathap, G., *Curr. Sci.*, 2014, **106**, 649–650.
6. Prathap, G., *Curr. Sci.*, 2016, **110**, 2210.

GANGAN PRATHAP

Vidya Academy of Science and Technology,
Thrissur 680 501, India and
A. P. J. Abdul Kalam Technological University,
Thiruvananthapuram 695 016, India
e-mail: gangan@vidyaacademy.ac.in

EMR exposure

This is regarding the article 'Mobile phone radiation induces sedation in *Periplaneta americana*'[1]. The authors have used 15 adult male cockroaches kept in a 30 × 18 cm box for exposure to electromagnetic radiation (EMR) emitted by a cell phone. The phone was kept in the box and made 1 min call every 5 min for 1, 3 or 6 h. Several assays were performed and the authors concluded 'the present study clearly explained the physiological and biochemical basis of adverse effect of EMR and is a warning for the judicious use of mobile phones'.

Several weaknesses in the study are pointed our here.

(1) The authors did not follow good study design[2].

(2) The study was not conducted 'blind', especially when dealing with the extremely controversial subject of exposure to mobile phones.

(3) There were no positive controls to validate the observations made in EMR-exposed cockroaches.

(4) There was absolutely no dosimetry giving the actual EMR exposure in cockroaches. The authors have just mentioned a standard cell phone, frequency 900 MHz, power 2 W and specific absorption rate (SAR) 0.35. Several cell phones are available for use and the model/make was not specified. The actual power output from the phone depends on the signal strength at the base site. No 'unit' for SAR was mentioned and, the value mentioned (0.35) might have been that of the phone tested for