

The results obtained are justified by selecting the articles that support the finding and ignoring those which do not fall in the line of thinking. It is also sad to note that the pathways proposed by various researchers and research groups under similar experimental set-up vary widely. In this context, mushrooming of journals has also contributed to deterioration in the quality of research.

As far as applied research in cancer biology is concerned, use of inappropriate cellular and animal models that do not replicate cancer in humans has been the major reason for drug failure in clinical trials. A combination of innovative and pragmatic experimental designs, appropriate preclinical models addressing heterogeneity and microenvironment of tumour, nutritional challenges to normal cells and drug targets in real spectrum, though difficult but achievable, is a realistic approach in anticancer drug discovery. Such studies can, perhaps, turn

around many an unprecedented setback of clinical trials in terms of efficacy and safety. To achieve this, investigators have to balance between academic requirement of publications and conscience. In this context, research-funding agencies, research institutes, medical research organizations and universities should encourage research proposals that address intriguing questions with technical feasibility that can crack the so far indomitable fort of cancer.

Cancer as a disease itself is so complicated and sensitive that only a trained and qualified medical practitioner is permitted to treat or administer medicines to a cancer patient. However, under the prevailing scenario, the number of trained and qualified medical practitioners involved in cancer research is too low. This has hindered progress in cancer biology research. Significant milestones in the 'war on cancer' have been achieved mostly by distinguished scientists having

a degree in medicine. Glancing through the list of Nobel Prize winners who have contributed to cancer biology research gives one a clearer picture. Otto Warburg, Harold Varmus and Harald zur Hausen are the few to mention. Unless issues related to cancer biology research are addressed pragmatically, the war against cancer would never lead to enduring freedom from it.

1. Jemal, A., Bray, F., Center, M. M., Ferlay, J., Ward, E. and Forman, D., *CA Cancer J. Clin.*, 2011, **61**, 69–90.
2. Kiberstis, P. and Marshall, E., *Science*, 2011, **331**, 1539–1540.

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The decline of the West – II

China and India continue to rise, while the West remains in decline¹ according to the fresh scientometric and economic data that has just come in from the 2012 report of *Science and Engineering Indicators*².

Appendix table 5-27 of *Science and Engineering Indicators*² compiles science and engineering (S&E) articles from all fields, by region/country/economy for the period 1995–2009 using a fractional count basis³. Appendix table 6-2 arranges the nominal gross domestic product (GDP), again by region/country/economy for the period 1992–2009 in terms of billions of dollars⁴. This data can be represented as shown in Figure 1 so that the world share of publications can be plotted against the world share of nominal GDP. There is good correlation between these two indicators – the higher the share of GDP, the higher the S&E output and this is captured in Figure 1.

Figure 1 shows the trajectories of the various regions and countries over the period 1995 to 2009. USA, EU and Japan continue to be in decline. In contrast, China, India and the rest of the world show steady progress, as reported earlier^{5,6}.

A better understanding of the rise and fall of various regions is offered if a second-order indicator of performance is introduced. One can think of GDP as a

zeroth-order performance indicator. Then the ratio of papers/GDP is an indicator or proxy for the quality of academic research performance in the country or

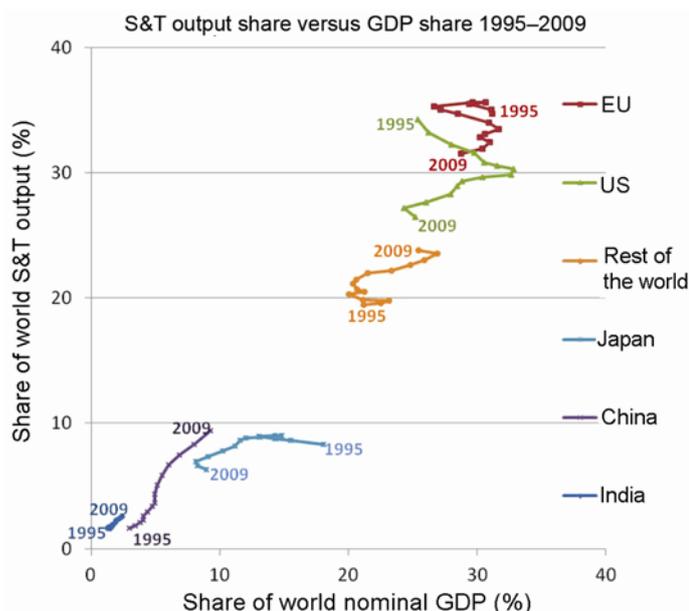


Figure 1. Trajectories of various regions and countries from 1995 to 2009 as world share of publications is plotted against the world share of nominal GDP – the higher the share of GDP, the higher the S&E output.

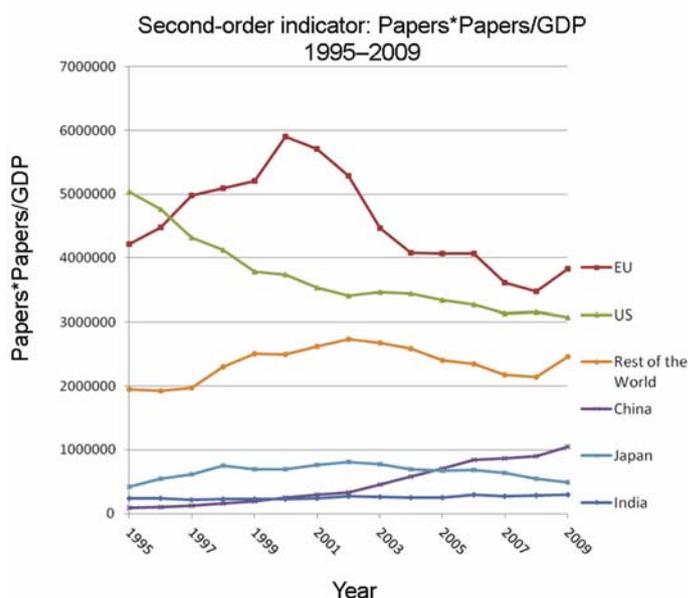


Figure 2. Time series of the second-order indicator, Papers \times Papers/GDP from 1995 to 2009 shows the very slow rise of India and the rapid decline of EU and US.

region. The number of papers follows as a simple product of $GDP \times (\text{papers}/GDP)$ and can be thought of as a first-order performance indicator. If this is continued to the second order through the operation, $GDP \times (\text{papers}/GDP)^2$, which can also be written as $(\text{papers} \times \text{papers}/GDP)$, we

have a proxy or measure for a second-order performance indicator. It can be interpreted to represent a scalar measure of the scientific activity of the country that takes into account both quality of performance and quantity of performance. In 2009, if we take China's second-order

indicator as the norm, India accounts for 0.28 of the Chinese effort, whereas EU and US are 3.63 and 2.93 times more active respectively, than China. Figure 2 displays the time series of the second-order indicator, papers \times papers/GDP, from 1995 to 2009. The relatively faster rise of China and the rest of the world, the very slow rise of India, and the rapid decline of EU and US are easily noticed.

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2. <http://www.nsf.gov/statistics/seind12/>
3. <http://www.nsf.gov/statistics/seind12/append/c5/at05-27.xls>
4. <http://www.nsf.gov/statistics/seind12/append/c6/at06-02.xls>
5. Prathap, G., *Curr. Sci.*, 2008, **94**, 1113.
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Indicators for occurrence of groundwater in the rocks of Eastern Ghats

Groundwater is struck at various depths in different places. For example, it may be available at a depth of 20–30 m at some places in MVP Colony, Visakhapatnam, Andhra Pradesh, and the rig may not strike water even after going beyond 60 m in Lawson's Bay Colony, which is not far away from MVP Colony. Similar conditions may be true in other places with rocks occurring in the Eastern Ghats.

The Eastern Ghats passes through the states of Odisha, Andhra Pradesh and Tamil Nadu. The important rocks are khondalites, leptynites and charnockites. The rocks of charnockites are predominant in Tamil Nadu; the khondalites and leptynites in Andhra Pradesh and the khondalites in Odisha. They have different characters of water-retaining capacities.

Thorough background information about the geological formations of any

area is an important prerequisite before conducting any survey for exploration of groundwater. The charnockites are massive, hard, compact, fine- to medium-grained and black-coloured (Figure 1 a), and do not have the capacity to transmit and store water, as they are not easily weathered and fractured due to their higher quartz content than that of feldspar and their fine- to medium-grained nature. They are generally used as road metals due to their hardness. Further, the khondalites are medium- to coarse-grained, light to dark brown in colour, with dark-pink dots, garnets (Figure 1 b), and are not as hard as charnockites. They are easily weathered and fractured due to their higher feldspar content than that of quartz and their medium- to coarse-grained nature. They have the capacity to transmit and store water. Sometimes,

clays are formed due to intensive fracturing of the khondalites, which do not support transmitting water. On the other hand, the leptynites, medium-grained and light cream to grey-coloured (Figure 1 c) are easily weathered and form light cream or white material. Generally, they support the occurrence of groundwater, but their areal extension is limited.

If black-coloured rock or powder is observed during digging or drilling, it indicates the occurrence of charnockites and the possibility of groundwater occurrence is rare unless the rocks have sufficient fractured network. If colour of the rock is brown, the occurrence of khondalites is expected, with a scope for groundwater. If the rock is cream in colour, the occurrence of leptynites is indicated and groundwater occurrence is less compared to that in the khondalites.