Lessons from the recent publication scams

Unethical short cuts are known to exist in research. However, the new revelation published in *Science*[1] has established that research misconduct does occur, and in an organized manner and at a larger scale than previously thought. This racket was exposed during a 5-month long research exercise conducted by *Science*[1], which showed that a large academic black market is actively working to tarnish the academic and research integrity of China. This unethical practice involves a number of agencies, scientists and editors. Such organizations guarantee one a publication, for an authorship fee ranging from US$ 1,600 to 26,300, in journals indexed by Thomson Reuters' Science Citation Index, Thomson Reuters' Social Sciences Citation Index and Elsevier's Engineering Index[1].

This new finding is challenging for academic and research reliability and adds a new dimension to the already existing complexity of publishers who have a range of fraudulent journals and work just to mint money from the aspiring authors[2–4]. Such publishers are comprehensively catalogued by Jeffrey Beal, a Scholarly Initiatives Librarian at the University of Colorado, Denver, USA, who keeps a watch on them in his blog: http://scholarlyoa.com/publishers/. However, even with such earnest scholarly attempts, it is becoming increasingly complex to keep track of corrupt researchers, publishers, agents, etc. because they are building new ways to trap people.

All of this, however, is not new; newspapers around the world made headlines when a famous Dutch social psychologist was found guilty of faking or manipulating data in dozens of publications, some of which were published in good journals[5]. Similarly, the case of a notable South Korean stem-cell researcher was equally shocking, when it was discovered that, nearly, all of his well-received work was fake[5]. Likewise, another major academic fraud was unearthed when a notable Harvard evolutionary biologist was found guilty of fabricating some of his publications[5].

Therefore, the immoral short cuts in research are known to exist; however, the motivation to take such extreme steps is not clearly established. There are various reasons which could initiate such motives; for example, in China, unhealthy practices are primarily driven by limited research grants, wherein people are forced to take unethical short cuts to receive the available competitive grants. Since merit-driven promotions in most of the institutes are measured by the number of publications in high-quality journals, it can easily trap scientists, especially the young scholars to adopt immoral short cuts[1]. In addition, a talent-based system of grading in academia/research can motivate scientists to wrongly inflate their findings[1]. However, there are many examples where motivation is primarily driven by greed and thirst to wrongly acquire wealth while in power. This is best exemplified by a recent academic misconduct that surfaced in the Kashmir Valley[6,7], where a former chairman of the Board of Professional Entrance Examinations was found guilty of proscribed involvement in the multi-million rupees Common Entrance Test scam in 2012. He, along with his group, sold the highly competitive medical entrance examination papers to a number of students for hefty amounts.

Thus, greed to acquire wealth or fame[8], reward system[9], norms and culture[10] and codes of conduct[11] can all promote such practices. This also suggests that the required remedies will vary. Thus, there is a need to rethink over the publication-driven promotions, grants and annual appraisals. Also, it is important to teach ethics to researchers, and to keep a check on their work through individual institutions and departments. Such accountability can track individual scientific contributions, which would eventually, help one to stop or minimize scientific misconduct. It would also be ideal to help or assist those researchers who are unable to win grants or publish good papers. Isolating such people will possibly force them to take such steps, which may prove difficult to handle for the research community in the long run.

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A. A. SHAH

Curtin University,
Sarawak Malaysia, 98009, Miri
e-mail: afroz.shah@curtin.edu.my

The world of research according to Science and Engineering Indicators 2014

Fresh scientometric and economic data have just come in from the 2014 report of Science and Engineering Indicators[1]. China and India continue to rise, while the West is seen to slow down.

Appendix table 5-26 of Science and Engineering Indicators[1] compiles Science and Engineering (S&E) articles in all fields, by region/country/economy for the period 1997–2011 using a fractional count basis[2]. Appendix table 6-03 arranges the Nominal GDP, again by region/country/economy for the period 1997–2012 in terms of billions of current dollars[3]. For some reason, the data for

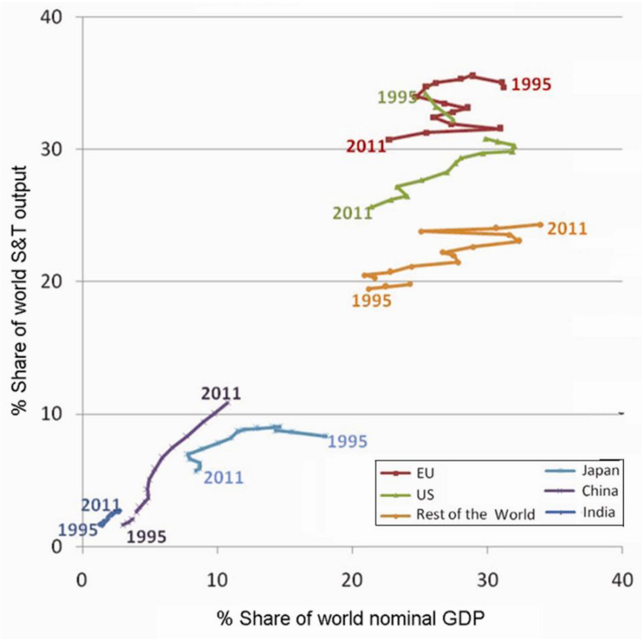

Figure 1. Trajectories of various regions and countries from 1995 to 2011 as world share of publications is plotted against world share of nominal GDP – the higher the share of GDP, the higher the science and engineering output.

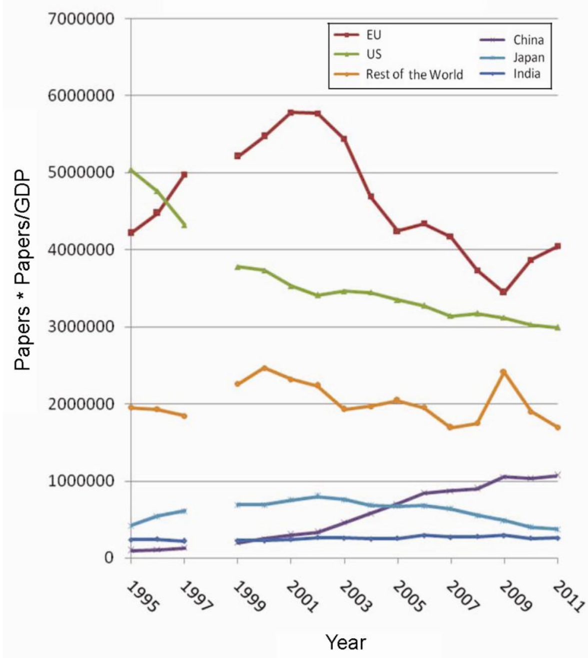

Figure 2. Time series of the second-order indicator, papers × papers/GDP from 1995 to 2011 shows the slow rise of India and the rapid decline of EU and the US.

1998 are missing in table 6-03. These data can then 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, this is captured in Figure 1.

Figure 1 also shows the trajectories of the various regions and countries over the period 1995–2011. USA, EU and Japan continue to slow down. China, India and the rest of the world show steady progress, as reported earlier[4–6]. The data for 1995 and 1996 are taken from a previous study[6].

One can obtain a better appreciation of the rise and fall of the various regions using a second-order indicator of performance[6]. If GDP is taken as a zeroth-order performance indicator, the ratio of papers/GDP becomes a proxy for the quality of academic research performance in the country or region. The number of papers follows as a simple product of GDP × (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 × $(\text{papers/GDP})^2$, which can also be written as papers × 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 and quantity of performance. In 2011, if we take China's second-order indicator as the norm, India accounts for 0.25 of the Chinese effort, while the EU and the USA are 3.79 and 2.80 times more active respectively, than China. Figure 2 displays the time series of the second-order indicator, papers × papers/GDP, from 1995 to 2011. The relatively faster rise of China and the rest of the world, the slow rise of India, and the slowing down of EU and USA are easily noticed.

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GANGAN PRATHAP

CSIR National Institute for Interdisciplinary Science and Technology, Thiruvananthapuram 695 019, India
e-mail: gp@niist.res.in