



India: Science & Technology 2008. P. Banerjee (ed.). National Institute of Science, Technology and Development Studies (CSIR), New Delhi. 2009. xLi + 367 pp. Price not mentioned.

The brief history of the science indicators movement began in 1973 when the National Science Foundation (NSF) brought out the inaugural edition of *Science Indicators*. The aim of the report was to present a set of indices which would reveal the strengths and weaknesses of US science and technology (S&T), in terms of capacity and performance of the enterprise in contributing to the national objectives. The different sections, written by hand-picked experts, looked at not only the state-of-affairs in the US but compared it with the rest of the world. It was an outstanding effort at capturing the state of S&T in the United States in all its facets. Subsequently, NSF started bringing it out at two year intervals and every edition improved upon the previous one, and a few years ago NSF changed the title of the report to *Science and Engineering Indicators*. The report is prepared for the National Science Board which submits it to the President of the United States. Naturally, it is highly regarded.

The NSF report provided the model for other reports. In 1984, the Organisation for Economic Co-operation and Development (OECD) started its *Science and Technology Indicators*, which was subsequently renamed *Main Science and Technology Indicators*. In 1994, European Union came up with a similar report. In some respects the compilers of the *European Report on Science and Technology Indicators* had used some new techniques and presented data on aspects not covered by the US report. But, unfortunately, the European Report has not appeared after its third edition that

appeared in 2003. France started its own S&T indicators report in 1992.

One was always longing for such a report on the status of science and technology in India and its impact on the economy and society. The Department of Science and Technology has been bringing out *R&D Statistics* for many years (and we should thank the late A. R. Rajeswari for that). But indicators are different from statistics. The CSIR manpower section has brought out a number of short reports related to S&T personnel, but these are not well publicized. A few years ago, the Indian National Science Academy (INSA) commissioned the National Council of Applied Economic Research (NCAER) to bring out a report. And now with this report from the National Institute of Science, Technology and Development Studies (NISTADS), India has come of age in the field of science indicators. One hopes it comes out regularly at two or three year intervals.

As Banerjee points out in his Introduction, this report 'draws upon facets of economic, social and educational life, where S&T has its footprints', and it is more than a set of S&T indicators; it is indeed a set of 'analytic descriptions of the state-of-affairs'. And as S. K. Joshi points out in his Foreword, such stock taking as presented in this report 'may stimulate policy makers to revisit some policy issues and approaches especially in coming years when a major share of our economic growth will arise from science and technology'.

The volume is divided into six sections: human resources; financing; structure, infrastructure and public space; industry; output and patents, and rural India and inclusive growth. Each section begins with an overview followed by many short chapters. Each chapter has a brief text often accompanied by tables and figures. These chapters are written by 59 authors, most of them from NISTADS and a few from other organizations. There are about 250 figures and 125 tables. Data and insights for the report have often been drawn from a variety of sources – mostly Indian – and these have been invariably acknowledged. Banerjee has made a suggestion worth following: 'The country very badly needs a strong mechanism to capture data related to S&T and innovation right from the regulatory or executive levels to source-points where S&T output or innovation gets generated.' He points to the success-

ful economic data system as a model. The data system in economics has evolved over decades and had the benefit of contributions from outstanding economists, statisticians and civil servants. We need to develop an equally competent and committed S&T cadre to gather and process data.

A report has come at the time when India's position in world science is rising and the world is looking at how a country where the majority of the population is below 30 years is using S&T for its advancement. We hear confusing signals. For example, we hear on the one hand that India produces large number of engineering graduates; on the other hand, we are told that most of them are unemployable. It is issues like these one would expect a volume like this to throw light on. Only then it could be considered to reveal the strengths and weaknesses of the Indian scientific enterprise.

Data on number of publications, citations, impact, etc. are readily available, and often at no cost, from competing publishers of databases. They are the low-hanging fruit. Reports like the one under review will do well to pay more attention to how science impinges on the economy and society.

Although the volume has covered the intended ground well, there are occasional lapses. To cite two examples, the chapter 'Profile of Indian science journals' has completely missed a major revolution taking place, viz. Indian journals going online and open access, and in the section on inclusive growth there is not a word about ICT-enabled rural development, an area in which India had played a prominent role in the past decade.

The printed volume is only a shorter version, about one fourth in length, of the online version. One of the strengths of the report is that it is not written in the style of a learned journal article or a chapter in an advanced monograph as it is meant to be read by a wide audience. Overall, the volume is produced well. The design and typography used are easy on the eyes.

NISTADS, Banerjee and the other contributors to this volume deserve to be congratulated for a wonderful job.

SUBBIAH ARUNACHALAM

*Centre for Internet and Society,
Bangalore 560 071, India
e-mail: subbiah.arunachalam@gmail.com*