

Anja Hartmann in 'Comprehensive Information Technology Security: A new Approach to Respond Ethical and Social Issues Surrounding Information Security in the 21st century' seeks to take a wider view of IT security with emphasis on the ethical and social as opposed to the organisational, technical and legal questions which have tended to dominate. This discussion is novel and timely but it also illustrates some of the problems in ethical considerations. Wrestling with questions of responsibility and conscience are fraught with difficulty and the subject of much unresolved debate among philosophers. The discussion also appears to overlook the fact that for some people ethical considerations are neither incentive nor obstacle. The consequences of such views also need to be considered.

This volume is certain to appeal to those with an interest in information security generally and, in particular, anyone who wishes to examine in detail the material presented at the IFIP TC11 conference. As might be expected some of the material is quite specialised and is unlikely to attract the reader who doesn't have a substantial background in the relevant area. This is the case in particular with parts four and eleven (Cryptography, Key Management Schemes and Mobile Computing; Access Control).

In part four, for example, G. Carter *et al.* in 'Analysis of DES Double Key Mode' describe a detailed cryptanalysis of a new mode of Data Encryption Standard (DES) which allows a 112-bit key, based on doubts raised during the early 1990s about the security of the DES algorithm.

One of the more recent developments in authentication is explored by W. G. de Ru and J. H. P. Eloff in 'Reinforcing password authentication with typing biometrics'. The analysis of a user's keystroke patterns is used to augment conventional authentication mechanisms. The authors argue that fuzzy logic techniques based on typing biometrics offer improved security at comparatively modest additional cost. This approach appears to offer some significant advantages including a reduced risk of damage from a compromised password, the inability to copy a user's biometrics profile by observing typing, easy integration into current systems, etc.

This book has something to offer any reader with more than a casual interest in information security, including the specialist. For the non-specialist, it provides an insight into those areas which were attracting considerable research effort during the early and mid 1990s, with many suggestions for future research directions.

If there is a problem with this book, it is the print quality. The quality varies, and while some of it is of a high standard, much of the text is faint and in a font size which is too small to make it comfortable to read. It is a pity that such a shortcoming, which could probably have been easily rectified, detracts from the material presented.

David Colhoun  
University of Wollongong  
Wollongong, Australia

**Institutional and Entrepreneurial Leadership in the Brazilian Science and Technology Sector—Setting a New Agenda, World Bank Discussion Paper No. 325**

Lauritz Holm-Nielsen, Michael Crawford & Alcyone Saliba (Eds)

Washington, DC, *The World Bank*, 1996, xv + 62 pp., US\$7.95, ISBN 0 8213 3653 3

The development of science and technology policy in developing countries has been relatively understudied—even more so the much needed policy reforms in these

countries. This volume is thus a welcome addition to the literature, despite the inevitable shortcomings derived from being the partial product of a workshop held in Washington in May 1995 which brought together Brazilian experts and decision-makers and World Bank staff. The workshop was jointly sponsored by the World Bank and Brazil's Ministry of Science and Technology, as part of a review of the Bank's sectoral lending program to the country. Its main objectives were to: contrast, in light of the recent tight budgets for the sector, Brazil's emerging science and technology policy with current international practices and lessons; and to assess three commissioned sectoral studies.

Given its mixed nature, as expected, the volume does not present an easy to follow and coherent picture. It is, in fact, subdivided in various sections of uneven quality in content and presentation, complemented by five annexes by: Lewis Branscomb, Harvard University; Jean-Eric Aubert, OECD; Daniel Newlon, National Science Foundation; Jean Guinet, OECD, and Peter Kreyenberg, German National Foundation. These, in fact, make up almost two-thirds of the volume.

The volume opens with a brief workshop summary, its program and participants, followed by a longer and more useful conference summary. The latter is organized around topical sections: (1) innovation and competitiveness; (2) assessing science and technology systems and institutions; (3) development of S&T in Brazil; (4) competitive funding; (5) the role of the (local) states; (6) efficient investment in S&T; and (7) the future of PADCT (Brazil Science, Research, and Training Project, partly funded by the World Bank). These are, however, in turn, summaries of short reports or conference presentations, a few of which are presented in the form of annexes. Unfortunately for the reader, references to these annexes in the footnotes are often confusing.

The first two topics are ably reviewed by Jean Guinet and Jean-Eric Aubert. The latter given its current importance in light of ongoing policy reforms deserves a brief commentary. Aubert blandly indicates that micro- and macro-indicators are the main tools for assessment and, therefore, countries like Brazil should adopt from OECD the relevant manuals and larger national policy reviews. In recent years, the national system of innovation approach (which underlies Aubert's S&T indicators framework) has bravely rescued the conventional macro top-down systems analysis approach of a bygone era to provide us with a policy-oriented comprehension of the workings of science and technology. The near abysmal lack of knowledge about the actual workings of the sector in developing countries, including Brazil, should put policy-makers everywhere on guard against buying into yet one more golden formula. While it is clear that assessment is much needed, the system-based indicators approach alone seems to be inadequate for the challenge at hand, even when it aims to collect data from firms, particularly as it often neglects the increasingly dynamic and multi-faceted knowledge circuit linking research to innovation and competitiveness.

The next topical section bares Brazil's deep structural sectoral weaknesses when compared to similar countries like South Korea or Turkey. For although Brazil has the largest S&T sector and the most sophisticated higher education system in Latin America, it spends half the percentage of its GDP on R&D and has almost one-fourth of the share of R&D scientists per 10 000 inhabitants as South Korea. and moreover has a smaller percentage of the population age group in tertiary education and share of R&D financed by the private sector than Turkey. The section however fails to present the main traits of the development of S&T in Brazil, even in the last decade. It provides rather an X-ray snapshot. Adding to the confusion, part of the policy development story is told only in the following section.

Competitive funding gets a marginally better treatment, as the section presents compact explanatory charts on structure and workings of just two of the country's three

main funding agencies. It nevertheless fails to tackle the issue of institutional reform and integration of the three, and to even mention the role of the Ministry of Science and Technology in the overall process. As it comments on the scant data presented, the volume makes the mistake of concluding that the lack of holders of doctor's degrees in the Brazilian private sector, when compared with South Korea and Sweden, for example, can be reduced to the competitive demand by universities for them. Thus failing to explore deeper causes to be found in the still unanswered responses to the question of why private firms in Brazil are unwilling to hire doctoral degree holders. More to the point is Simon Schwartzman's, author of one of the commissioned studies, acute observation that:

In the resulting configuration, Brazilian S&T is becoming a narrow interest group working in increasingly precarious conditions. It lacks the legitimacy to demand the resources needed to grow and complete the more significant role that the current paradigm demands of an S&T system. (p. 13)

Policy recommendations to arrest this negative trend suggested in the volume talk of the by now standard-issue technology policy that encourages the transfer, diffusion, and absorption of technological capacity. It further specifies that such can be obtained through reduction of large-scale projects, improved metrology and information, greater international technological opening and incentives for private sector technological investments. In addition, it recommends a restructuring of the funding system to ensure qualified and sufficient human resources, the strengthening of basic science, science education, university-industry ties; widening the educational scope of graduate programs, increased use of electronic technologies for knowledge dissemination, and finally, the adoption of 'flexibility based on peer review and market responsiveness' (p. 13).

The discussion of the role of local states benefits from the thoughtful and enlightening comparative report on the US model of federal and state level cooperation, incorporating seminar commentaries, by Lewis Branscomb, and fortunately to the reader reproduced in an annex. Picking on the flexibility theme of the previous section, it states that innovation is increasingly achieved by smaller firms and that similarly state governments are often smaller and more flexible, besides being more adapted to devising and deploying economically relevant S&T policy. Thus, in the US, at least, state governments are better positioned to diffuse and commercialize research. It is mentioned that Brazil's National Research Council (CNPq) has been jointly funding research with state governments, a right move in this direction. CNPq is, however, criticized for not giving a role in decision-making to engineers and technologists, as well as the private sector. It is also noted that whereas some state S&T agencies have performed well, notably Sao Paulo States FAPESP, whose activities are summarized in a chart, most are strapped for funding and even those few with a budget lack a clear cut mission. And they are not aided by the fact that current institutional programs have no role for them in S&T policymaking or implementation.

The discussion of efficient investments in S&T is mildly confusing. On the one hand, it suggests that Brazilian agencies should redirect their support toward the encouragement of productive use of scientific output. On the other, it recommends stable funding for individual scientific initiatives targeted on excellent researchers, that is, keeping the policy focus on the scientific production side.

The final section on the future of PADCT may be a bit despairing for readers unfamiliar with the program and its convoluted history, despite a brief historical characterization in the earlier workshop summary. For it is hard to judge the assessments

of the two previous programs herein presented as well as to clearly assess the policy recommendations for the third, which should have been launched in mid-1997.

The somewhat inflated claims about the earlier programs based on the report of the international review and oversight committee—that the program has acquired a unique experience in intellectual property rights matters, that it has broken down the walls of Brazilian higher education ‘Ivory Tower’ (which a committee member in a Freudian slip termed ‘Ivy [sic] Tower’), that new transparent funding mechanisms have been established, that new types of university–industry cooperation were launched, and that without it Brazilian science might have collapsed—in the end boil down to the conclusion ‘that PADCT brought modest progress to Brazilian S&T during a period of severe resource constraint and public sector crisis’ (p. 18). PADCT rather constituted, in the reviewer’s opinion, a stopgap policy measure that preserved the existing policymaking status quo and thus failed to initiate a much needed institutional reform in the functionally overlapping yet disparate Brazilian S&T policy agencies. As for PADCT greater transparency, it suffices to recall that the reviewer has been trying for a year to obtain from the program office its official history, announced to have been available in mid-1996!

What the future holds for the PADCT, according to the volume is, puzzlingly, greater focus on human resources training, in conjunction with private sector cooperative institutions, a meritocratic research reward system and functional decentralization to state agencies. Its two main priorities are therefore the creation of an enabling environment for private sector involvement in R&D and the expansion of qualified human capital. But as old statist suspicions die hard, it affirms that ‘Industry-only funding will be considered solely in exceptional cases ...’ (p. 17).

The workshop’s main conclusions, flying surprisingly against the liberalizing winds blowing in Latin America these days, calls for a proactive government role in consolidating past reform achievements, in making new investments and regulations more efficient and granting greater international access for the domestic research community. And the actual list of proposed reforms constitutes a solid shopping list for S&T policy reformers elsewhere.

In short, this volume constitutes a truly rich *smorgasbord* in contents for students of S&T policy in developing countries, particularly policy reform and Brazil. However, the table is poorly set up, the dishes are unevenly presented, and the sauces a bit too rosy. The policy-oriented reader who is able to carefully pick and choose, and add a grain of salt, will nevertheless come out of it satisfied.

Antonio J. Junqueira Botelho  
The Johns Hopkins University/PUC-Rio/ Instituto de Estudos  
Avançados-USP  
Rio de Janeiro, Brazil

### **The Remaking of Television New Zealand 1984–1992**

Barry Spicer, Michael Powell & David Emanuel

*Auckland, New Zealand, Auckland University Press, 1996, x + 207 pp., NZ\$34.95, ISBN 1 8694 0151 4*

Spicer *et al.* introduce their effort as a book ‘about the remaking of Television New Zealand (TVNZ) into a commercially successful state-owned enterprise and the management and organisational upheaval experienced by the organisation as a result’. And what