Book reviews

Bits of Power: Issues in Global Access to Scientific Data. **Committee on Issues in the Transborder Flow of Scientific Data, US National Committee for CODATA, Commission of Physical Sciences, Mathematics, and Applications, National Research Council (National Academy Press, Washington, DC, 1997, xii+235 pages, ISBN 0-309-05635-7)**

This work is a path-breaking attempt to identify key institutional and technical issues influencing the availability and access of data communication resources for international scientific collaboration. Its significance to readers of this journal is twofold. First, it highlights the potential conflict between the 'privatisation' of scientific data and the value that may be derived from international scientific co-operation. This raises questions about the nature and scope of regulation of intellectual property rights, content standards, and transnational data flows that are increasingly part of the telecommunication environment. Second, it identifies specific barriers and constraints to extending the use of scientific data communications for reducing the costs and improving the quality of creating and distributing scientific knowledge. Scientific research stimulates innovative use of telecommunication networks. Many of the problems now being experienced in scientific data exchange will be encountered in the near future in business and government applications of advanced telecommunication networks.

A central theme of this book, and one that is salutary in the context of discussions of 'ability to pay' for data access, is the impact of rapid technological change on the integration of developing countries into the international scientific community. Although the gap between information rich and poor environments is widening by some measures (such as technology availability), the growing availability of scientific information on the Internet has the potential to improve developing and transition economy scientists' access to, and participation in, the international scientific community. Remote access to scientific data and even scientific apparatus is an exciting development with many potential benefits including stemming or reversing the 'brain drain', reducing gaps in scientific knowledge, supporting a broader international division of labour in scientific research, and reducing the costs of, and barriers to, technology transfer by increasing local absorptive capacities for new scientific and technical knowledge.

Key problems in the development of scientific data resources identified in this work include the rapid growth of the stock of scientific data, the lack of funding for data management and preservation, the rapid obsolescence of data storage media and formats and the security problems of electronic data networks. These problems are accompanied by shortcomings in provisions for access to available data resources such as absence of indexing and cataloguing and the absence of infrastructure for high-capacity 'real time' access to experimental resources which would support remote scientific experimentation. All of these issues suggest that if 'infrastructural' funding issues can be solved there are likely to be growing demands from the scientific community for

telecommunication services and capacity. Addressing the infrastructural issues of the scientific community is also a vehicle for developing solutions to similar problems of generating and distributing information in other contexts such as government administration and the private sector.

An issue of growing significance is the improvement of the communication of scientific results, and particularly the evolution of electronic scientific publications. At the most basic level, questions of how to reduce the costs of scientific communication without abandoning important roles of publishers of scientific journals suggest that new access pricing models and provisions of IPR protection will be needed. Beyond the basic level, however, an entirely new frontier is opening in which communication of scientific results can embody data and computational resources (e.g. through inclusion of, or linkage to, operating software) in which not only the results, but the research environment producing results, can be part of the scientific communication process. The implications of these developments for specific scientific communities is examined in this book. Scientific communications that offer other researchers access to virtual models of physical systems, far more detailed data resources, and much more complete documentation of research methods suggest that the process of scientific research itself may be influenced by the capabilities of telecommunications.

The most controversial chapter of this book examines whether current developments in intellectual property protection are likely to constrain the development of scientific data communication. The focus of this chapter is on the European Directive on Databases adopted on 11 March 1996, which confers a sui generis (each can be protected) intellectual property protection to both print and electronic data compilations as well as related proposals being considered by the US and the World Intellectual Property Organisation (WIPO). The chapter introduces the controversy by noting that commercialisation of scientific data is one means for supplementing public investment in the creation of database resources. Later, however, it highlights the possibilities for the creation of new 'information monopoly' rights which would constrain access to scientific data. Many readers will conclude that the primary argument of the chapter revolves around a 'special pleading' for less restrictive database access for research and educational purposes, an extension of the 'fair use' doctrine in copyright law (most extensively developed in the US).

The central issue, however, remains the trade-off between the public benefit of receiving information at its cost of reproduction (which with electronic transmission can be very low) and the incentives provided to database compilers to create new databases or add value to existing ones. The argument of this chapter is that 'first mover' advantages in database creation, even where the original source of data is in the public domain, may discourage competition and result in educational and research organisations facing the prospect of having to pay substantial amounts to acquire information which individually and collectively they were responsible for creating. The significance of this development is highlighted by the enactment of very broad protections for data compilers, in which even the use of insubstantial excerpts is to remain under the compilers' control. The context of these developments is, of course, the greatly heightened extent to which liberal market policies are coming to dominate policy discussions. From a policy perspective, however, the issue raised by this chapter is whether it is inappropriate to set in place a regulatory structure that may substantially raise the market power of database compilers and thereby substantially raise the price and constrain the availability of information, particularly for research and educational purposes, without also considering how to mitigate the impact of these prices on users that do not receive a commercial benefit from the use of such data.

This book highlights the emerging public policy issues in the field and will therefore interest the science and telecommunication policy communities. The book's summary of technological issues giving rise to these policy issues will, however, interest a wider audience including those involved in developing telecommunication technology and services.

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The Social Shaping of Information Superhighways: European and American Roads to the Information Society, **Herbert Kubicek, William H Dutton, and Robin Williams (Eds.) (Campus Verlag, Frankfurt, St Martin's Press, New York, 1997, 372 pages, ISBN 0-312-16569-2)**

This volume is a collection of conference papers that were presented at a conference in Bremen, Germany in October 1995. This conference originated as an activity of the Co-operation on Scientific and Technical research (COST/A4) programme funded by the European Commission, which supports a European network of social scientists interested in the social shaping of technology. It is a good idea to bring together academics, policy representatives and professionals, but this does not provide any guarantees for the making of a book. Had the editors presented this collection as a conference proceedings, this book might receive a more favourable evaluation. But since the volume is presented on the cover as an edited book, different criteria must apply.

Unfortunately, this book fails to live up to expectations. Except for the two concluding chapters, none of the 19 articles substantially bears on, or contributes to, theories on the social shaping of technology. Several articles are relevant to the subject such as case studies of the French Minitel, digital broadcasting in Germany, or chapters on access and universal service policies. However, these articles add little information to the already abundant literature on the subject. For the same reason, different articles on public policy in the United States and in the European Union fail to come up with new insights. Moreover, these contributions — most of which were written by government officials — adopt a rather uncritical approach. One exception to this is a critical article on EU policies about regional development and cohesion by Paschal Preston.

Other chapters contain valuable information; for example, there are contributions on the funding of technological development and on the influence of public interest groups on telecommunication policy.

In general, however, most of the authors do not establish an explicit relationship between their subjects and theories on the social shaping of technology or they have a very loose understanding of these theories. In the introductory chapter, Kubicek and Dutton state that 'when intelligent people find themselves faced with very similar problems, it is not surprising that they arrive at similar solutions' (p. 30). This is a somewhat surprising argument for a book on the social shaping information superhighways. One might expect authors who are concerned with this subject to emphasise the view that ideas and opinions are circumstantially shaped and tend to vary in