



**IFIP**

*The Role of Science and Technology in the Information Society*



**Workshop: Room A  
2 July 2002, Geneva  
15h-18h**

**Chair/Rapporteur:**

**Amos Tincani (EC)**

15.00	Welcome and Introduction	Carthage Smith, Deputy Executive Director, ICSU
15.10	The Contribution S&T Information Society	Sir Roger Elliott Chair ICSU Press
15.30	The Importance of Open Access and Public Domain of Data and Information for S&T	Peter Schindler ICSU/CODATA ad hoc Group on Data and Information
15.50	Social Implications of Information Technologies in Developing Countries	Chrisanthi Avgerou London School of Economics
16.10	Discussion	
17.00	Close	

## *Summary of the Workshop*

A three hour workshop on *The Role of Science and Technology in the Information Society*, takes place on July 2, 2002 in Geneva. The workshop is organized by ICSU, the International Council for Science, in collaboration with CODATA, the Committee on Data for Science and Technology and IFIP, the International Federation for Information Processing.

The workshop takes place within the framework of the first meeting of the World Summit of the Information Society (WSIS) Preparatory Committee 1-5 July 2002.

Among the issues to be addressed at the meeting are the following:

### **The Contribution of S&T to the Information Society**

Not only have the Science and Technology (S&T) Community gained from the developments that have taken place within the Information Society, but the Information Society has also directly gained from the scientific research carried out by the S&T Community. The www, the internet and browser are but some of the developments that have come from the publicly funded research and these tools have undoubtedly revolutionised the Information Society.

It is essential that the contribution of S&T research is recognised by promoting publicly funded research, by recognizing the importance of open access to data and information in order to carry out this research and by acknowledging the profound effects these contributions have on the well being of people and the economies of the world

### **The Importance of Open Access and Public Domain of Data and Information for S&T**

See background document One attached.

### **Social Implications of Information Technologies in Developing Countries**

See background document Two attached.

It is envisaged that this workshop will be the first of several meetings that will be organized by the S&T community over the coming years the objectives of which will be:

- To highlight the role and the contribution of S&T to the information society
- To identify issues the S&T community considers important within the context of the information society
- To examine ways and means on how these issues can be highlighted within the WSIS process eventually leading to the summit in December 2003 and Tunisia 2005
- To engage in constructive dialogue with other sectors of civil society, business and industry and governments

A discussion will take place on how the S&T community can directly or indirectly participate within the WSIS process and the issues that should be highlighted within this process.

It is understood that a report on this workshop will be submitted to the Summit. It will also provide the basis for the formal establishment of a Working Group on S&T for the summit

For more information on the Groups and the issues involved please consult the following websites:

<http://www.icsu.org/> <http://www.codata.org> <http://www.ifip.or.at/> [http://www.codata.org/data\\_access/index.html](http://www.codata.org/data_access/index.html)



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## Background ONE Document

### *The Importance of Open Access and Public Domain of Data and Information for S&T*

#### Background Document

Data and information produced by government-funded, public-interest science constitutes a global public good caught between two different trends. On the one hand, the Internet provides valuable new opportunities for overcoming geographic limitations and the promise of unprecedented open access to public information for research on a global basis. On the other hand, there are growing restrictions on the availability and use of public data and information arising from the privatization and commercialization of such sources.

While there has been a great deal of focus on new commercial opportunities with digital information and on increased intellectual property rights, comparatively little attention has been devoted to the importance of maintaining open access to the source of upstream scientific--and other--data and information produced in the public domain for the benefit of all downstream users, or to the imperative to balance the public and the private interests. The question is, how to preserve and promote access to and sharing of such public scientific resources without unduly restricting new opportunities for commerce or the moral rights of authors? Or, conversely, how to promote commercial activities in the private sector without significantly compromising the availability of data and information in the public domain or through open access for global public good purposes?

The recent pressures on both public-domain and open-access information--scientific and otherwise--have resulted from a variety of legal, economic, and technological factors. New and revised laws have broadened, deepened, and lengthened the scope of intellectual property and neighbouring rights in data and information, substantially redefining and limiting the public domain. National security concerns also are constraining the scope of government data and information that can be made publicly available. Economic pressures on both government and university producers of data and information similarly have narrowed the scope of such information placed in the public domain, with resulting access and use restrictions on resources that were previously openly available to researchers, educators, and others. Finally, advances in digital rights management technologies for enforcing proprietary rights in various information products are posing some of the greatest potential restrictions on the public domain and open access to data and information.

Nevertheless, some well-established mechanisms for preserving public domain or open access data and information--such as public archives and data centers, together with ever-increasing numbers of open Web sites--exist in the government, academic, and not-for-profit sectors. In addition, very innovative institutional and legal models for making available digital scientific data and information resources in the public domain or through open access provisions are now being developed by different groups in the scientific, library, and legal communities in many countries.

Activities focused on these issues have recently been undertaken by several international organizations. For example, the International Council for Science, together with the international CODATA, has sponsored an ICSU-CODATA ad hoc Group on Data and Information since 1997, which has focused on the importance of full and open access to scientific data and information on a global basis. This group submitted a white



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## **Background ONE Document**

paper on these issues to the World Intellectual Property Organization in 1997 and subsequently developed a set of guiding principles. Details on these documents can be found on [http://www.codata.org/data\\_access/index.html](http://www.codata.org/data_access/index.html).

The Committee on the dissemination of Scientific Information (CDSI/ICSU Press) provides important advice to the ICSU family about scientific publications new developments and information technology and it identifies and support new initiatives that will increase local publication and general access to high quality scientific and scholarly materials. The impact of the information society on publications especially in the field of electronic publishing has definitely influenced the dissemination of information.

### *Social Implications of Information Technologies in Developing Countries*

Since its formation in 1989, the IFIP WG 9.4 (International Federation of Information Processing, Working Group 9.4 on the Social Impact of IT in Developing Countries) has been focusing attention to the thorny issues of ICT and Development (see <http://is.lse.ac.uk/ifipwg94/>). Its series of conferences and publications brought together for debate the accounts of multiple research studies and professional experiences from many countries, thus creating a body of valuable knowledge on the efforts pursued worldwide to exploit the developmental potential of the new ICTs. This short presentation will outline the main contribution of this stream of work to the understanding of the digital divide problem.

The research of the Group is based on the recognition of the unprecedented opportunities ICTs offer to developing countries for economic growth and improvements in all areas of modern society, from business to health, education, and democracy. The grossly uneven diffusion of technology among countries and regions and the severe scarcity of technology resources in many parts of the world is an ever-present obstacle to that end. This problem of the 'digital divide' is rightly attracting attention by international institutions, governments and the academic community, and the WSIS under preparation is undoubtedly a crucially important event.

A number of developing countries have developed substantial capacity to produce ICTs and related services and some, most notably India, have achieved a remarkable presence in the global ICT industry. Moreover, most developing countries have already a long experience in developing ICT applications at least in some sectors of their economy and society. However, research on efforts made to develop and utilize ICTs and their outcomes reveals some other dimensions of the digital divide in need of attention. Even when they mobilize the required resources for ICT innovation, organizations in many countries fail to derive substantial benefits from ICTs. A very common story found in case studies from developing countries is how innovative projects with high developmental expectations run into difficulties and either are discontinued or result in the ineffectual introduction of new technologies. It is of course a well-known problem in industrialized countries too that information systems projects often fail to be completed or to meet their intended objectives, but in developing countries this is a particularly acute problem. ICT-based information systems are too often assimilated into existing inefficient work practices, are operated in a distorted and ineffectual version of their designed functionality, or they are marginalized within the work practices of the organization and left unused.

It is necessary to look at the roots of this problem not only because of the waste of valuable and hard-gained resources but also because of the negative consequences it entails within a global economy. For example, inclusion in global production and trade partnerships as well as donation of aid and development loans often depend on the condition that organizations in developing countries have in place effective ICT-based operations. Clearly the fulfilment of such conditions requires far more effort than acquiring technology applications, and it is vital to understand what processes of change it entails.

It is well understood in industrialized countries that benefits such as efficiency, productivity, competitiveness, etc. do not result from merely implementing ICT applications in business organizations. Business firms achieve such benefits by continuously working out changes in their products and services, in their work practices and management structures, and in their relations with customers. Similarly, IT does not on its own improve the services of government organizations. E-government entails a very demanding political process of state administration reform. Also we know that such processes of organizational change are only partly a matter of specialist professional interventions for planning and designing the desirable new organizational performance features; they largely depend on such local capacities as people's tacit knowledge, and their own ability of making sense of the new situation confronting them and of improvising. Such understanding may explain some of the difficulties that hinder effective ICT innovation in the organizations in developing countries. In so far as they attempt to transfer 'best practice' in ICT implementation and organizational processes they tend to rely heavily on formal codified knowledge, which often disregards local tacit knowledge and effective courses of action in the local socio-political context. One of the main messages derived

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## Background TWO Document

from the WG9.4 research is the significance of allowing scope for local improvisation. This however suggests a feature for the global information society that is not frequently acknowledged: that of respecting diversity of organizational practice rather than seeking to standardize a set of uniform best practices across socio-cultural contexts.

Another problem that has been highlighted in the WG 9.4 research is that the development of a local ICT industry does not on its own trickle down to developmental benefits such as poverty alleviation.

There is little evidence, for example, that a successful export oriented software industry in a developing country, such as that of Bangalore in India, contributes to improving the standards of life of the vast numbers of very poor people. This does not lessen the significance of the industrial capacity of developing countries for the competitive production of ICTs, but points to the need of policy efforts beyond the fostering of an ICT industries. Indeed, most countries and development agencies are sensitive to the need to provide technology infrastructures for those segments of the population that cannot acquire them on their own, with community telecentres a prime example of intervention to deliver information services as well as to demonstrate, educate, and familiarise with some fundamental tools of the information society. Yet, studies so far show that such initiatives have quite a low success rate. A great deal more research is needed to understand the value of ICT-mediated information services in the context of life of different communities. The internet-based services that many of the telecentres have aimed to provide may prove an unrealistic vision that does not address the perceived needs of the local community. Alternative schemes need to be explored and policy efforts towards experimentation in use of ICTs in locally meaningful ways are at least as important as the fostering of a competitive local industry, albeit more difficult to achieve and less glamorous.

In conclusion, the main message I can draw from a stream of almost 15 years of studies on ICT innovation efforts in developing countries is that diffusion of ICTs does not on its own make an impact. It needs to be accompanied by efforts to work out effective practices in organizations and new collective socio-economic activities in communities. Such efforts, while they are inevitably driven by the ICT industries and influenced by international management consultancy prescriptions and powerful business partners, rely heavily on local meanings, politics, and the capacity for local improvisation. The situated nature of ICT innovation cannot be circumvented by the services of well-meaning experts, and international aid agents and consultants. It is a process that needs to be understood and built in our notion of the formation of the global information society.

Summary of Introductory Speech Given at Working Session 7 of the Civil Society's input to WSIS PrepCom 1, Geneva, 2 July 2002

Speaker: Dr Carthage Smith, Deputy Executive Director, International Council for Science (carthage@icsu.org)

**“Perspectives from the Science and Technology Community”**

This session is co-organised by: the International Council for Science (ICSU), whose membership includes national science academies from across the world and international science unions; CoData, which is a specialized body affiliated to ICSU dealing with scientific data issues; and the International Federation of Information Processing (IFIP), whose membership includes national computer societies from across the world. This partnership is, at least in part, representative of the international public sector science and technology (S&T) community – both developed and developing world - and our interests in the information society range from access to genetic data and meteorological records through to electronic publishing and communication. The S&T community also has a crucial role to play in both the development of ICTs and in researching the economic and social effects of ICT development. Hence we would argue that much of what we do actually underpins the development of the information society *per se*. Moreover, scientific data and information from diverse fields of research is in itself the lifeblood of a knowledge based society and ensuring universal access to this information is in all our interests.

So, following on from yesterday's discussion – what does civil society have to offer this summit? Someone mentioned, “expertise, experience and knowledge” and that is certainly what the S&T community have to offer. If what we really want is an information society that is based on evidence, then the S&T community should have a central role in WSIS. The challenge for scientists is to engage constructively with all the other stakeholders – other sectors of civil society, the private sector and Governments; scientists are not always the best communicators. On one hand we have to know what the specific research needs are for the information society and on the other hand we need recognition of the needs of the broader S&T community in the new information society. This raises issues about the public domain and open access, which are currently being threatened by new legislation: agreeing common principles between different stakeholders on the difficult issues of IPR, copyright and ownership of electronic data and information must be a priority for WSIS.

Finally I would just say a few words about the World Summit on Sustainable Development, where ICSU is also playing a role in the dialogue sessions as a lead member of the S&T community ‘major group’. It has become very clear in these discussions that the ‘digital divide’ or perhaps more accurately the ‘knowledge divide’, is a major obstacle to sustainable development. ICTs present both an opportunity and a threat to (scientists in) developing countries. Free and open access to scientific data and information are crucial to sustainable development and this needs to go hand in hand with developing the (scientific) capacity to exploit and expand on this information at the local level. The forthcoming discussions in Johannesburg and the WSIS are inextricably linked and the S&T community has a key role to play in both.

## **Civil Society Workshop, WSIS Prepcom 1, Geneva, 2 July 2002**

### **7- Perspectives from the science and technology community**

President: A Tincani (European Commission)

Rapporteur: C Smith (International Council for Science)

#### **Issues**

- The publicly funded research community is an important member of civil society with a very valuable contribution to make to the information society;
- Publicly funded R&D is the basis of the current IT revolution: the internet, the web, the browser were all initially developed in the public sector;
- As well as leading to new technologies, scientific research, particularly in the social and economic sciences, can provide the evidence base on which to properly develop the information society;
- Publicly-funded academic research in all fields is a public good; universal, free and open access to the data, information and knowledge coming from research must be ensured;
- New regulatory regimes on copyright and databases are a serious threat to the 'public domain' and the universality of science.
- The further development of open source, as opposed to proprietary software, and/or more innovative licensing schemes for the latter, is important with regard to the accessibility and affordability of public domain information;
- The ICT revolution means that scientific research data and information from many fields can be disseminated faster and more effectively. However, the 'digital divide' and new regulatory regimes, threaten to isolate developing countries even more in the new knowledge society;
- Information is not knowledge and education, training and building scientific capacity in developing countries is as crucial in this regard as providing access to ICTs;

#### **Major Stakeholders on this issue**

- The publicly-funded/academic research community
- Policy-makers/decision makers
- The private sector (source of major proprietary research and immediate down-stream financial beneficiaries of much academic research)
- Civil society globally

#### **Expected outcome for the summit**

##### **Principles**

- The key role of the academic S&T community in underpinning the further development of the information (and knowledge) society needs to be recognised;
- Scientific knowledge should provide the basis of informed decision-making by policy makers;
- ICTs have incredible potential for expanding the knowledge society but universal access to scientific knowledge must be ensured if the digital divide is not to be translated into a knowledge divide;
- The protection and expansion of the public domain for information is crucial to ensuring the dissemination of scientific data and information and hence to the development of a global knowledge society;

### Actions

- Recognition that the dissemination of scientific data and information, from both local and distant sources, is crucial to the development of a knowledge society and that this raises particular issues about access for developing countries.
- Ensure that the IPR, copyright and database regulations relating to electronic data are designed to strengthen the public domain;

### Partnerships

- Ensure that the advice of the academic S&T community is taken fully into account by decision makers with regard to the development of the information society;
- Build partnerships at local, national, regional and international levels between the S&T community, governments, the business sector and other sectors of civil society to ensure that appropriate strategies are developed for optimising the benefits of ICTs.