



Report

Multi-Stakeholders Consultation Meeting on "E-Science" (Action Line C7)

China Resources Hotel, Beijing, China

22 October 2006

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Summary

The E-Science multistakeholders consultation meeting was held in the China Resources Hotel, Beijing, P.R. of China on the 22 October 2006 (one day before the 20th International CODATA Conference which will be held in Beijing, 23-25 October 2006). The meeting was attended by 35 participants from non-governmental organizations and government representatives, who came from the following countries: Azerbaijan (Republic of), Brazil, Canada, China, Cuba, Georgia, India, Japan, Jordan, Nigeria, Oman, Palestine territory, Sri Lanka, USA, Zambia.

UNESCO organized the E-science multi stakeholder consultation meeting in its capacity as the provisional focal point. It was hosted by the Government of China and organized in conjunction with CODATA and the Chinese Academy of Science. UNCTAD representative, Prof. Hafiz Mirza, also attended the meeting.

The meeting was started by a short Opening ceremony to set the stage. Mr. Mustafa El Tayeb, Director of Division for Science Policy and Sustainable Development, opened the meeting. After its opening remarks, Mr. El Tayeb invited four resource persons, Prof. Shuichi Iwata, President of CODATA and Dr Paul F. Uhler, Director of International S&T Information Programs, Dr Francis Muguet, chair of the WSIS Civil Society Working Group on Scientific Information (WSIS-SI) and Dr. Baoping YAN, Director of Expert Committee for Informatization of Chinese Academy of Science, to give their presentations which were followed by a discussion. In the following session, all participants were invited to express their opinion and their expectation on E-Science.

The meeting participants designated UNESCO as facilitator, and UNCTAD as co-facilitator, of the C7 E-Science action line. The meeting participants constituted themselves as an initial core group of the E-Science Action Line. Membership of the core team could be extended to government and international organization representatives, scientists, librarians, and other concerned stakeholders. The participants have also agreed about the next actions to be taken by the multi-stakeholder team.

Meeting Report

1. Opening session

The meeting was started by a short Opening session to set the stage. Mr. Mustafa El Tayeb, Director of Division for Science Policy and Sustainable Development, opened the meeting. Mr. el Tayeb refreshed memory of participants about the E-Science. The E-science is part of the WSIS Action Line C7, entitled ICT applications: benefits in all aspects of life. ICT applications can support sustainable development, in the fields of public administration, business, education and training, health, employment, environment, agriculture and science within the framework of national e-strategies. Accordingly the Action line C7 para. 22 defines 5 areas of action that are essential to promote development and sharing of scientific knowledge development within the context of ICT.

Given, however, the breadth of the topics covered under E-science and considering the varied expertise and priorities among stakeholders, it is suggested that we identify/establish sub-groups working on specific areas/topics of the Action Line.

The multistakeholders consultation meeting aims to:

- facilitate the initial contacts and sharing of information among multistakeholders on their priorities and expertise in the implementation of each area of action;
- consolidate a multistakeholders team for E-science;
- designate facilitator(s)/moderator(s) for the multistakeholder team¹
- agree on the working methods of the multistakeholder team, including their activities and expected outcomes.

At the end of his remarks Mr. El Tayeb invited participants to agree about the meeting agenda. The provisional meeting agenda was approved by participants.

2. Invited Speakers

- a. Genesis of E-Science and next step for its implementation
by Shuichi Iwata, President of CODATA

Prof. Iwata Brief History-Dawn started his presentation by explaining a brief historical background on the interest of the CODATA in E-Science. The CODATA starting point is the ICSU/CODATA UNESCO Symposium March 2003 held at UNESCO Headquarters in Paris, where we have set the following agenda on science data:

¹ UNESCO is only a "provisional" or "interim" facilitator unless the first consultation meeting officially endorses UNESCO as the "official" facilitator. Thus, the meeting agenda should foresee the nomination of the official facilitator.

- Describe the role, value, and limits that the public domain and open access to digital data and information have in the context of international research.
- Identify and analyze the various legal, economic, and technological pressures on the public domain in digital data and information, and their potential effects on international research.
- Review the existing and proposed approaches for preserving and promoting the public domain and open access to S&T data and information on a global basis, with particular attention to the needs of developing countries.
- Identify and analyze important issues for follow up by the ICSU family of organizations and for the development of an Action Plan in this area by ICSU and UNESCO in preparation for the World Summit on the Information Society (WSIS).

After this Symposium, several activities have been conducted in linking with information society, such as: WSIS Summit in Geneva December 2003, CODATA 2004, CODATA UNESCO Symposium September 2005, WSIS Tunis, and CODATA 2006 in Beijing. It is good time to think about the status of digital sharing data and information.

To step forward, we need many methodologies such semantic, ontology and transfer model. We also need to pay attention on field of educational system (capacity building) how to deal with data, as well as how to improve science productivity around the world. There is small science, which are not used effectively, and how to with long tails of individual care-exemplars' and paradigms.

He stated that we have been emerging with mistakes and successes. We need to make our experiences into public goods. It starts from our collaboration fighting against public bad!

The digital system is divided between the haves and not- haves. There is a need to a universal access with equal opportunities for all to scientific knowledge and the creation and dissemination of scientific and technical information-fair competition.

He described the condition of the data activities in general:

- The databases are everywhere, but not well organized and too many duplications, less interoperability, and piecewise.
- How to integrate the databases for ad hoc application
- We need to design positive incentives to go beyond "collection"
- There are many that have not been used by a majority of people but it could be useful for others.

Our big challenge is how to develop a service channel adapted to the contents, contexts and users. The first solution is that we need to change our mind set by using E-Science. Data Science may contribute as one of discipline of E-Science.

At the end of his presentation, Prof Iwata invited meeting participant to work together to establish E-Science under leadership of UNESCO.

- b. CODATA Global Information Commons for Science Initiative
by Paul F. Uhler, Director, Office of International Scientific and Technical Information Programs, The National Academies, Washington, DC, USA

Dr. Uhler introduced his presentation by explaining the historical background behind the global information for science. There is a tremendous difference between old print paradigm and global digital network paradigm, from point of view qualitative and quantitative.

He defined the information commons as a digital information originating principally from government or publicly-funded sources, made freely available for common use online, either in the public domain or with only some limited rights reserved, typically organized thematically through an institutional mechanism.

Existing information commons (open access) models:

- Open data centers and archives (e.g., GenBank, space science data centers);
- Federated open data networks (e.g., World Data Centers, Global Biodiversity Information - Facility, South African Environmental Observation Network);
- Virtual observatories (e.g., the International Virtual Observatory for astronomy, Digital Earth);
- Open access journals (e.g., PLOS + > 2500 scholarly journals, many in developing world → SciELO, Bioline International);
- Open institutional repositories for an institution's scholarly works (e.g., the Indian Institute for Science, + > 100s/Ks? globally)
- Open institutional repositories for publications in a specific subject area (e.g., the physics arXiv, Qi Ji, PubMedCentral);
- Free university curricula online (e.g., the MIT Open CourseWare);
- Discipline-based commons (e.g., conservation commons).

Advantages of information commons for science:

- Facilitates transfer of information North → South and South ↔ South;
- Promotes capacity building in developing countries;
- Promotes interdisciplinary, inter-sectoral, inter-institutional, and international research and cooperation;
- Avoids duplication of research and promotes new research and new types of research;
- Reinforces open scientific inquiry and encourages diversity of analysis and opinion,
- Allows for the verification of previous results,
- Makes possible the testing of new or alternative hypotheses and methods of analysis;
- Facilitates the education of new researchers;
- Enables the exploration of topics not envisioned by the initial investigators;
- Facilitates automated digital knowledge discovery and diffusion;
- Generally helps to increase the research potential of digital technologies and information, thereby providing greater returns from the public investment in research;
- Many other economic, social, and political advantages (not covered here)

Key obstacles to creating information commons:

- Development of adequate incentives at the individual, community, institutional, and governmental levels;
- Long-term financial sustainability of different information commons models;
- Legitimate legal restrictions (protection of national security, privacy, confidentiality, and IPRs);
- Effective technical and organizational implementation.

Failure to overcome these obstacles leads to compromises in achieving the ideal commons approach and may frequently result in the creation of ^asemi-commons^o.

The objectives of CODATA's GICSI are to:

- (1) Improve understanding and increase awareness of the societal and economic benefits of easy access to and use of scientific data and information, particularly those resulting from governmental or publicly funded research activities;
- (2) Identify and promote the broad adoption of successful institutional and legal models for providing open availability on a sustainable basis and facilitating reuse of data and information;
- (3) Encourage and help coordinate the efforts of the many stakeholders in the world's diverse research community who are engaged in devising and implementing effective approaches to attaining these objectives, with particular attention to the circumstances of the developing as well as developed countries.
- (4) Promote all of the objectives of the Initiative through the development of an online ^aopen access knowledge environment^o.

Key milestones:

- GICSI concept developed at the U.S. NAS and CODATA 2002-2005
- Initiative formed at CODATA Workshop at UNESCO, in September 2005
- Initiative formally announced at WSIS in Tunis in November 2005
- GICSI workshops held in Dublin, Brussels, and Beijing in 2006
- Funding currently being solicited to establish Secretariat and regional offices to implement the GICSI objectives

At the end of his presentation, Dr Uhlir invited participants to support CODATA effort on the development of the CODATA Global Information Commons for Science Initiative.

c. E-Science" (Action Line C7)

by Dr. Francis , Muguet, chair of WSIS Civil Society Working Group on Scientific Information (WSIS-SI <http://wsis-si.org>).

Dr. Francis Muguet started his presentation by refreshing the memory of participants about the formulation of WSIS action lines (recommendation). The process of the WSIS was initiated by Tunisia. The idea was to bridge the digital divide within the context of sustainable. The recommendations were made through an intergovernmental process. The States were those who voted the recommendations. In this summit, was used multi stakeholders approach involving civil society and private sector. This approach was new and innovative.

He explained as well the legal value of recommendations. There are several. The first one, is that a State may implement the recommendations of the summit without another State being able to criticize it, because the latter has also undersigned the WSIS recommendations. For example, if government decides to enforce an open access policy, no other country may oppose it before the WTO (World Trade Organization) on the ground that this policy may jeopardize the interests of commercial publishers.

Another value which is also important, relates to the situation of an institution, in a certain country, that wishes to implement an open access policy. It will be difficult for the government of that country to criticize this open access policy. since this government has already undersigned recommendations in favor of Open Access policies at the WSIS. Therefore, the importance of the WSIS recommendations cannot be underestimated, even if governments are not bound to enforce them.

Dr. Muguet discussed Open Access within general context, above the purely scientific context. Whenever Open access is pictured as only an idealistic view, it is criticized by the commercial publishing sector, as "anti-business", therefore it is necessary to dispel this misrepresentation, and to study the issue from a global perspective. Concerning research financed by public funding (State or Government), the rationale of financing research is to stimulate economic growth. If we are making a macro economic analysis, even within an ultra liberal view, Open Access does make sense as not being "anti-business" but on the contrary, as an active pro business policy fostering job creation, since it is making available information crucial to economic development, and in particular sustainable development. The current situation tragically decreases the Keynesian multiplier factor of public funding of scientific research. Open Access vastly increases this factor. Open Access has also a positive impact on Education and Learning across all sectors of society, all over the world. From an ethical point of view, the question must be debated whether it is ethical to resell donated health information.

This meeting is one of the series of meeting organizing by UNESCO to follow up the WSIS action lines, others action lines were discussed recently in Paris. In the Paris meeting was accepted the principle that the topics of action lines are divided into two: the main item topics and cross-cutting ones.

At the end of his presentation, Dr Muguet proposed to follow the topics as itemized in the WSIS texts for E-Science:

The main item topics:

1. (*Plan of action 22a*) academic network access, also related to action line C2 9c) and C4
2. (*Plan of action 22b*) open access, related to with action line C3 10 i) and Geneva declaration of Principles para 28),
3. (*Plan of action 22c*) scientific knowledge sharing with P2P
4. (*Plan of action 22d*) preservation of scientific data and scientific database
5. (*Plan of action 22e*) Metadata, semantic web and standardized ontologies for scientific information

For the cross cutting topics:

1. Research (Geneva declaration of Principles)
2. Ethics in science (related to action line C10)
3. Digital divide linked with financial mechanisms (Tunis agenda)
4. Multi stakeholder partnerships (Tunis agenda)
5. Biomedical research and health (strongly related with C7 e-health)

Dr Muguet has also emphasized that the working methods of the C7 e-science action line should take some inspiration from those adopted in Paris for the C3 access to knowledge action line.

Cross-cutting subgroups are required for better coordination and to avoid duplication of efforts. Some cross-cutting subgroups do also correspond to items of the Tunis agenda, such as financial mechanisms and multi stakeholder partnerships whose follow-up has not been organized yet with a clear assignment to specific UN agencies.

The principle, that only intergovernmental organizations could be retained as e-science action line facilitator or co-facilitators, seems reasonable, considering the high costs of coordination within the scientific sector, at the condition that moderators at the [¶]paragraph[°] or topic or subgroup level could be chosen in an inclusive way and that financial assistance could be provided to help civil society groupings such as the WSIS Civil Society Working Group on Scientific Information that has played a crucial role in the WSIS process so far, to carry on subgroup moderating or co-moderating activities.

Concerning Action line co-facilitators, scientific IGOs such as CERN, or regional IGOs such as OECD or cultural IGOs, such as Francophonie, could be of assistance in their respective capacities and mandates.

It is essential that some governments from both developed and developing countries be included as subgroups moderators or co-moderators. The involvement of governments, that are concerned with the crucial linkage between Open Access and Sustainable Development, is essential to the overall success of the implementation of this action line.

- d. China Academy of Sciences' (CAS) E-Science Activities
by Dr. YAN, Baoping, Director, Expert Committee for Informatization of CAS, Chief Engineer, Computer Network Information Center of CAS

After giving general introduction about CAS, Dr Yan explained the reasons why the CAS is interested in promoting E-Science. She said the following challenges in research push CAS to develop E-Science:

- ± Science problems are more complex than ever
- ± Science research object is not isolated, but cross-discipline and large-scale
- ± Science data processing, simulation and computing become indispensable methods
- ± Scientific researchers need more and more communication, collaboration, and coordination among them closer than ever¼

Features of e-Science

- Opening: Joint together to cross-discipline, research organization and country; complex problem solving under open environment
- Sharing: Supercomputer, Data, Instruments, Human, results for research,
- Coordinating: Researching with colleagues or partners, distributed any places, institutes or across oceans as if they were within a same lab, via a kind of virtual research Lab.

Some Elements of e-Science

- E-Science Environment: Cyber-infrastructure and Scientific Research Facility based on IT
- New Scientific Research model under e-Science: e-science workflow
- New Organization Model for Researching under e-Science: v-Lab
- New tech & software: system/middleware/application, grid, web service, CA, security¼.
- New Scientist: e-Scientist ± IT- enable researchers
- Pilot e-Science Applications

The E-Science Environment consist of:

- Computing resources: compute, storage,
- Scientific Data resources: test data, observe and survey, collect¼
- Communication resources: network¼
- Digital Library
- Digital specimen Library
- Scientific Instruments and wild field observing stations based IT and Internet (networking «last mile»)
 - accelerators, telescopes, sensors¼
 - eco-system station, Atmosphere station, disaster station¼..

CAS started his action in E-Science by Informatization Program of CAS in 2001-2005, with total budget of 43.75 Millions US Dollar. The goals of this program are (i) Upgrading

the cyber-infrastructure, i.e. , CSTNet , super computing, mass storage, SDB; (ii) Integrating content: CAS' Web, Virtual Science Museum; (iii) Driving some science researches based IP; (iv) Developing new IT technologies, including grid, NGL. and (v) Training IT-enable scientists and researchers.

Several scientific investigating Actions in wild field have also been conducting such as: Predication of earthquake in Yangjiang, Guangdong, LURR special scan of the Chinese Mainland and the location of Yangjiang earthquake; long-term climate simulation, weather effect on ecosystem and city planning of Beijing.

Following activities have also been conducting/

1. Scientific Database (SDB) developments, which involving 45 institutions across 16 cities to create 503 databases (16.6TB+ total volume), covering many disciplines such as: chemistry, biology, geosciences, environment, astronomy, high-energy physics, ¼

2. Standardization Activities

- Standardized scientific database development process
 - ± Published a standard specification for documents of database development
 - ± Documents of database lifecycle are required
- Promoting scientific database publish and ^afull and free^o sharing
 - ± Published an ordinance of data publish and share
 - ± Most members published ^adata sharing statement^o

3. Scientific Data Grid (SDG) is composed of two parts, core services and application-oriented services, especially in architecture.

At the last part of her presentation Dr Yan presented the CAS' e-Science Planning in Future, 2006-2010, within the CAS 11th Five-year Informatization Program:

- ± Continue to develop the infrastructure and existing applications: SDB, NSDL, HPC(.100Tflops), CSTNet(2.5-10Gbps), ARP-2, ¼
- ± e-Science Facility: Networks of field stations/instruments, Mobile equip., Digital library of natural resources
- ± E-Science Applications: HEP, Astro, Bio, Geo, Chemistry, ¼
- ± Resource Integration Platform: Glue between infrastructure and e-Science facility
- ± Supporting Environment for Applications: Glue between facility and applications

The E-Science in CAS is developing on the five following element: (i) Cyber-infrastructure, Lambda network, HPC, mass storage, SD; (ii) Cyber-resource integration; (iii) Experimental Facility based IP; (iv) E-Science Virtual Lab; and 5v) E-Science Applications

At the end of her presentation Dr Yan summarized her presentation as follows:

1. Future scientific researches and scientific applications need much more new and useful environment, tools and models

2. E-Science or science researches through cyber- infrastructure will be one of the main goals of CAS in the next five years
3. E-Science need more international collaborations on cyber infrastructure and e-Science applications
4. Merging scientific domain and IT, not only in IT technology and scientific knowledge, but also in human, e.g. e-scientist

3. Round Table Discussion

After an introduction by the UNCTAD representative Prof. Hafiz Mirza, representatives or participants from the following countries expressed their opinion and expectation on E-Science: Georgia, Azerbaijan, Jordan, Brazil, Nigeria, West Bank (Palestine territory), Germany, and Zambia.

In general participants have a lot of expectation about E-Science to resolve the problems of access to scientific data and information, both in developed and in developing countries.

4. Appointment of the Facilitator:

At the suggestion of the representative from Nigeria, the participants unanimously elected UNESCO as lead facilitator for Action line C-7, E-Science with UNCTAD as a co-facilitator.

It appears that specifically in the scientific field, only Intergovernmental Organizations have the status and sufficient resources to cover the costs of their own activities, and to contribute to overall WSIS implementation.

5. Working Arrangement

We should develop a core group who will determine the programme activities in E-Science and would act as a inclusive convenor. The core group is currently composed with the participants of the–Beijing multi stakeholders meeting. The Core group should work on specific topics. Dr. Uhlir proposed to bring people who are working in E-Science in the core team, instead of starting a new topic without any specialist in the field.

Dr El Tayeb, director of UNESCO Division for Science Policy and Sustainable Development, reiterated the need to avoid delays and the intent of UNESCO to closely follow the items in the WSIS texts that were determined after several years of intense intergovernmental negotiations, and to fully play its role of facilitator, with an emphasis towards development, underlined by the presence of UNCTAD as a co-facilitator.

The draft terms of reference of the Action line multi-stakeholder team, of the reference of the facilitator, and the Working methods have been refined to reflect those orientations, recent decisions of ECOSOC and CSTD.

Dr. El Tayeb thanked Prof. Hafiz Mirza, and UNCTAD for having made possible the participation of several scientists from developing countries.

Conclusion : UNESCO and UNCTAD are going to mobilize the core-group while trying to convene more people, with the help of all WSIS stakeholders, in a more efficient and inclusive way than for the first action-line meeting.

Consultation on facilitation of
WSIS Action Line:
"E-Science" (C7)

22 October 2006, 09.30 a.m. - 4.30 p.m., China Resources Hotel, Beijing, China

Meeting Agenda

1. Opening Remark by UNESCO Representative,
By Mustafa El Tayeb, Director Science Policy and Sustainable Development Division
2. Adoption of the agenda
3. Reports
 - a) Genesis of E-Science and next step for its implementation, by Prof. Shuichi IWATA, President, CODATA
 - b) Outcome of the Digital Information Commons for Science, by Mr Paul F. Uhler, Director, Office of International Scientific and Technical Information Programs, BISO, USA
4. Initial sharing by stakeholders of their respective actions and priorities in the implementation of the E Science (C7)
 - Intervention and presentation of participants:
 - Presentation by Prof. Yan Bao Ping, Director, Information Expert Committee Group, Chinese Academy of Sciences.
5. Modalities of the implementation of the E Science (Action Line C7)
 - a) Terms of reference of the Action line multi-stakeholder team
 - b) Terms of reference of the facilitator/moderator
 - c) Designation of a facilitator/moderator of the multi-stakeholder team
 - d) Activities of multi-stakeholder team and the expected outcomes
 - e) Working methods of the multi-stakeholder team on E-Science
6. Next Steps



Implementing Action Line C7 "E-Science"

Draft Terms of Reference for functioning of the Multi-stakeholders Team ²

The present Terms of Reference are intended to serve as a guideline for the organizing the work of the stakeholders of Action Line C7 E-Science

A. *Role of Multi-stakeholder Team*

1. The Multi-stakeholder Team for Action Line C7 E-Science (referred to as ^aTeam^o) is comprised of all interested parties including governments, private sector, civil society and international organizations; the number of its members will be open-ended.
2. The overall goal of the Team is to facilitate the implementation of WSIS Action Line C7 E-Science, mainly through networking stakeholders, enhancing information exchange, knowledge creation, promoting and sharing good practices, investigating and promoting suitable legal frameworks, examining opportunities for collaboration and establishing partnerships among interested parties.
3. The Team will define its working methods, work plan and time table, as well as expected outcomes of its activities taking account of the terms of reference for moderators/facilitators of WSIS Action Lines, prepared on the occasion of the consultation meeting of action line moderators/facilitators (Geneva, 24 February 2006) (see Annex) that has been further refined.
4. The Team will identify actors in an open and inclusive process that ensures a mechanism for the full and active participation of governments, the private sector and civil society from both developing and developed countries, (*cf wording in Plan of Action, para 13.d*) in addition to WSIS stakeholders, for the implementation of Action Line C7 E-Science, including IGOs, NGOs, civil society groups, academia and private sector and will ^amap^o

² Draft prepared by UNESCO Secretariat for the Action Line C7 E-Science consultation meeting (22 October 2006, Beijing, PR China)

their activities in order to understand who the actors are and the scope of their interest in Action Line C7 E-Science.

5. Considering the breadth of the topics covered under Action Line C7 E-Science and the varied expertise and priorities among the stakeholders, the Team is to establish sub-groups working on the specific areas/topics itemized in Action Line C7 E-Science as well as other topics, notably cross-cutting topics, that could be identified, now and in the future, as appropriate by the team.
6. The Team will designate a facilitator for Action Line C7 E-Science (referred to as ^aFacilitator^o), whose task will be defined in the subsequent paragraphs. The Facilitator could be a representative from government, intergovernmental organization, private sector and civil society. The Facilitator should be able to provide sufficient resources to cover the costs of its own activities, and/or to contribute to overall coordination of Action Line C7 E-Science. The Facilitator may constitute a cost-efficient multistakeholder advisory board to assist the Facilitator in its tasks.
7. The Team is also to designate a lead moderator, and possibly several co-moderators for each sub-group (referred to as ^aSub-group Moderator^o)³.

B. *Role of Facilitator and Sub-group Moderators*

8. The main task of the Facilitator will be to coordinate the work of the Team as defined in paragraphs above so as to facilitate the networking, information exchange, sharing of experiences and good practices and identification of synergies among stakeholders, *inter alia*, by providing free and interoperable on-line networking tools, while ensuring an optimal choice of appropriate software that will best contribute to achieving development goals within local conditions (*Geneva Plan of Action para 10 j*), suggesting processes and templates and/or organizing physical meeting, as appropriate. The Facilitator will work in cooperation with any Sub-group Moderators, who will carry out similar functions in respect of their sub-group.
9. The Facilitator will compile a report⁴ on the activities of the Team on the basis of the inputs from the Team Members, with a view to enable the ECOSOC to carry its responsibilities for overseeing the system-wide follow-up to WSIS outcomes, and specifically the Commission on Science and Technology for Development that effectively assist ECOSOC as the focal point in the system-wide follow-up, in particular the review and assessment of progress made in implementing the outcomes of WSIS (*ECOSOC resolution on the CSTD, 27 July 2006*), as well as UN agencies and programs active in the overall implementation process (such as ITU, UNESCO and UNDP), to have a complete picture of implementation across all action lines. The Facilitator will follow the

³ The draft terms of reference of Moderators/Facilitators adopted on the occasion of the consultation meeting of action lines moderators/facilitators (Geneva, 24 February 2006) uses the terms ^aModerator^o and ^aFacilitator^o interchangeably. However, for the purpose of the present document, the term ^aFacilitator^o will be used for the facilitation and coordination of the overall Action Line and ^aModerator^o for the coordinator of a sub- group.

⁴ Report can be further completed with additional information including, updates or additions to the existing WSIS stocktaking data base, which is available on <http://www.itu.int/wsis/stocktaking/index.html>.

instruction from the CSTD as regards to the frequency and period of submission of such report.

10. The Facilitator will participate, where necessary, in the coordination meeting of all facilitators of Action Lines and contribute to the overall reporting to all stakeholders on WSIS implementation.
11. The main task of any Sub-group Moderator will be to assist the work of the Facilitator by ensuring the networking of, as well as information exchange and sharing of good practices among the stakeholders of a specific sub-group. The Sub-group Moderators will also assist the Facilitator in reporting on the activities of the Team.

C. *Role of Team Members*

12. Each Team Member will: carry out concrete activities to further the objectives and implementation of Action Line C7 E-Science within the framework of its own mandate, programmes and resources; provide to the Team information on its respective initiatives including events, projects and studies; share its experience, knowledge and good practices with other Team Members through the modalities to be defined.
13. Each Team Member will provide inputs to the Facilitator and/or Sub-group Moderators on its activities related to the follow-up of Action Line C7 E-Science. with a view to facilitate reporting.

Terms of Reference for Facilitators & Moderators of WSIS Action Lines⁵

Context

Paras 108-109 of the Tunis Agenda for the Information Society set out a plan for multi-stakeholder implementation at the international level of the WSIS Plan of Action. The Annex to the document proposes a list of moderators/facilitators for stakeholder teams for each Action Line.

Responsibilities of Action Line Facilitators and Subgroup Moderators/

1. The primary goal of each multi-stakeholder team is implementation of the WSIS Plan of Action at the international level. A secondary objective is information-sharing and promotion of WSIS goals.
2. For each action line, action line facilitators and subgroup moderators should take the lead in facilitating the work of multi-stakeholder teams of interested parties (including governments, private sector, civil society, and international organisations).
3. For each action line, there may be several facilitators and subgroup moderators, including representatives from governments, private sector and civil society as well as appropriate UN agencies or Regional Commissions. However, one or two of the facilitators and moderators should be nominated as exercising the lead role for the purposes of coordination.
4. UN agencies or Regional Commissions and other stakeholders may be involved in more than one action line, both as moderators/facilitators and as participants.
5. The coordination of the implementation of each action line should help to avoid duplication of activities by, *inter alia*, information exchange, creation of knowledge, sharing of best practices and assistance in developing multi-stakeholder including public/private partnership (*Tunis Agenda*, para 110).

⁵ Endorsed by the participants of the consultation meeting of Action Lines moderators/facilitators (24 February 2006, Geneva)

6. The modalities of coordination for each action line are to be worked out among the facilitators and moderators, as well as among the participants in the multi-stakeholder team. They may involve, for instance, a combination of face-to-face meetings, teleconferences, online forums, joint projects or programmes, websites, databases, newsletters etc.
7. Each multi-stakeholder team should seek to establish two-ways interactive dialogues with national implementation mechanisms (para 100) and with regional implementation activities (para 101)
8. Each multi-stakeholder team should develop reports on an [annual] basis for submission [before the end of November each year] to enable the suggested lead agencies (ITU, UNESCO and UNDP) to report on a complete picture across the action lines. These reports may also take the form of updates or additions to the WSIS stocktaking database, to be maintained and updated by ITU and UNCTAD.
9. Candidates to serve as Action Line Facilitators should be able to provide sufficient resources to cover the costs of their own activities, and/or to contribute to overall WSIS implementation.
10. Action Line Facilitators and subgroup Moderators should be prepared to participate in coordination meetings among all facilitators and moderators, to be held [once or twice per year] and to contribute to the development of overall reports on WSIS implementation.
11. In the event of queries, action line facilitators should refer to the Commission on Science and Technology for Development that effectively assist ECOSOC as the focal point in the system-wide follow-up, in particular the review and assessment of progress made in implementing the outcomes of WSIS (*ECOSOC resolution on the CSTD, 27 July 2006*),



Working methods of the multi-stakeholder team on Action Line C7 ^aE-Science^o

A. Introduction

Action Line C7, paragraph 22, recognizes the importance of science as key factors for the development of an Information Society that will contribute to economic and social development. Accordingly the Action line C7, paragraph 22, defines 5 areas of action (a) to (e) that are essential to promote scientific knowledge dissemination within the context of ICT.

Given, however, the breadth of the topics covered under Action Line C7, E-Science, and considering the varied expertise and priorities among stakeholders, it is suggested that we identify/establish sub-groups working on specific areas/topics of the Action Line.

B. Definition of sub-working groups

The definition is made by following closely the items of the WSIS texts :

(*subgroup a*) academic network access, also related to action line C2 9c) and C4

(*subgroup b*) open access, related to with action line C3 10 i) and Geneva declaration of Principles para 28),

(*subgroup c*) scientific knowledge sharing with P2P

(*subgroup d*) preservation of scientific data and scientific database

(*subgroup e*) Metadata, semantic web and standardized ontologies for scientific information

For the cross cutting topics: an open-ended list is proposed that could be completed and regrouped anytime by the multistakolder team is proposed :

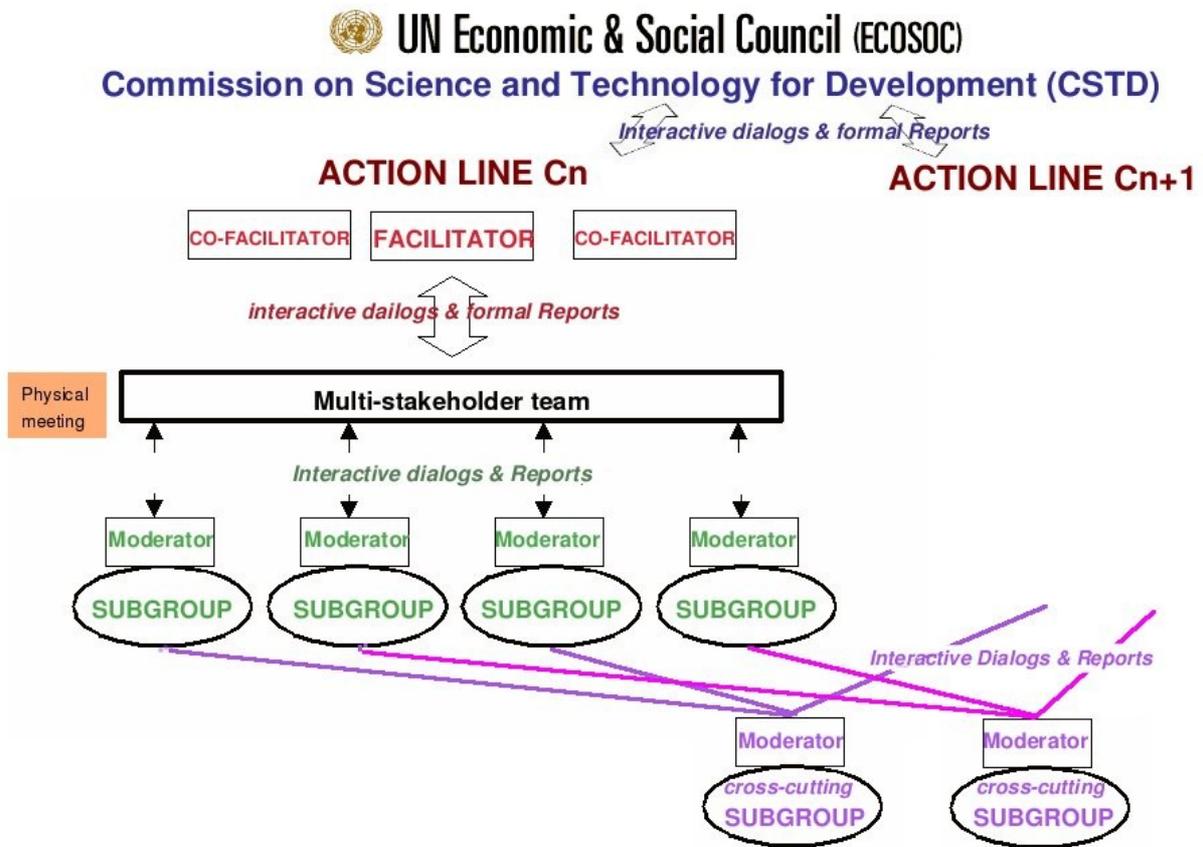
- Research (Geneva declaration of Principles)
- Ethics in science (related to action line C10)
- Digital divide linked with financial mechanisms (Tunis agenda)
- Multi stakeholder partnerships (Tunis agenda)
- Biomedical science (strongly related with C7 e-health)

C. Possible activities of the E-Science Multi-stakeholder team and of each subgroups

- Formulating public policy in achieving the objectives
- Identify concrete activities and/or group of activities for common implementation;
- Implement concrete activities which respond to the respective objectives of the Working Group;
- Exchange knowledge, experiences and best practices in the respective topic, using free and interoperable online tools, and promote them at national and regional level;
- Make an assessment of legal frameworks with a view to overcoming any obstacles. and specifically to overcome the digital divide and barriers to access.
- Strengthen international cooperation in the respective topic and pilot initiatives jointly designed, co-funded and implemented;
- Monitor and report new findings, developments and initiatives in the respective topics.

- Explore, in collaboration with other partners, the possibility of undertaking a global review of experiences in open access regimes, especially with regard to free and open source software and open academic and scientific journals (*CSTD resolution May 16, 2006, Geneva*)

Modalities for interactive coordination and reporting



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Plan of Action

A. Introduction

1. The common vision and guiding principles of the Declaration are translated in this Plan of Action into concrete action lines to advance the achievement of the internationally-agreed development goals, including those in the Millennium Declaration, the Monterrey Consensus and the Johannesburg Declaration and Plan of Implementation, by promoting the use of ICT-based products, networks, services and applications, and to help countries overcome the digital divide. The Information Society envisaged in the Declaration of Principles will be realized in cooperation and solidarity by governments and all other stakeholders.
2. The Information Society is an evolving concept that has reached different levels across the world, reflecting the different stages of development. Technological and other change is rapidly transforming the environment in which the Information Society is developed. The Plan of Action is thus an evolving platform to promote the Information Society at the national, regional and international levels. The unique two-phase structure of the World Summit on the Information Society (WSIS) provides an opportunity to take this evolution into account.
3. All stakeholders have an important role to play in the Information Society, especially through partnerships:
 - a. Governments have a leading role in developing and implementing comprehensive, forward looking and sustainable national e-strategies. The private sector and civil society, in dialogue with governments, have an important consultative role to play in devising national e-strategies.
 - b. The commitment of the private sector is important in developing and diffusing information and communication technologies (ICTs), for infrastructure, content and applications. The private sector is not only a market player but also plays a role in a wider sustainable development context.
 - c. The commitment and involvement of civil society is equally important in creating an equitable Information Society, and in implementing ICT-related initiatives for development.
 - d. International and regional institutions, including international financial institutions, have a key role in integrating the use of ICTs in the development process and making available necessary resources for building the Information Society and for the evaluation of the progress made.

B. Objectives, goals and targets

4. The objectives of the Plan of Action are to build an inclusive Information Society; to put the

potential of knowledge and ICTs at the service of development; to promote the use of information and knowledge for the achievement of internationally agreed development goals, including those contained in the Millennium Declaration; and to address new challenges of the Information Society, at the national, regional and international levels. Opportunity shall be taken in phase two of the WSIS to evaluate and assess progress made towards bridging the digital divide.

5. Specific targets for the Information Society will be established as appropriate, at the national level in the framework of national e-strategies and in accordance with national development policies, taking into account the different national circumstances. Such targets can serve as useful benchmarks for actions and for the evaluation of the progress made towards the attainment of the overall objectives of the Information Society.

6. Based on internationally agreed development goals, including those in the Millennium Declaration, which are premised on international cooperation, indicative targets may serve as global references for improving connectivity and access in the use of ICTs in promoting the objectives of the Plan of Action, to be achieved by 2015. These targets may be taken into account in the establishment of the national targets, considering the different national circumstances:
 - a. to connect villages with ICTs and establish community access points;
 - b. to connect universities, colleges, secondary schools and primary schools with ICTs;
 - c. to connect scientific and research centres with ICTs;
 - d. to connect public libraries, cultural centres, museums, post offices and archives with ICTs;
 - e. to connect health centres and hospitals with ICTs;
 - f. to connect all local and central government departments and establish websites and email addresses;
 - g. to adapt all primary and secondary school curricula to meet the challenges of the Information Society, taking into account national circumstances;
 - h. to ensure that all of the world's population have access to television and radio services;
 - i. to encourage the development of content and to put in place technical conditions in order to facilitate the presence and use of all world languages on the Internet;
 - j. to ensure that more than half the world's inhabitants have access to ICTs within their reach.

7. In giving effect to these objectives, goals and targets, special attention will be paid to the needs of developing countries, and in particular to countries, peoples and groups cited in paragraphs 11-16 of the Declaration of Principles.

C. Action Lines
C1. The role of governments and all stakeholders in the promotion of ICTs for development

8. The effective participation of governments and all stakeholders is vital in developing the Information Society requiring cooperation and partnerships among all of them.
 - a. Development of national e-strategies, including the necessary human capacity building, should be encouraged by all countries by 2005, taking into account different national cir-

cumstances.

- b. Initiate at the national level a structured dialogue involving all relevant stakeholders, including through public/private partnerships, in devising e-strategies for the Information Society and for the exchange of best practices.
- c. In developing and implementing national e-strategies, stakeholders should take into consideration local, regional and national needs and concerns. To maximize the benefits of initiatives undertaken, these should include the concept of sustainability. The private sector should be engaged in concrete projects to develop the Information Society at local, regional and national levels.
- d. Each country is encouraged to establish at least one functioning Public/Private Partnership (PPP) or Multi-Sector Partnership (MSP), by 2005 as a showcase for future action.
- e. Identify mechanisms, at the national, regional and international levels, for the initiation and promotion of partnerships among stakeholders of the Information Society.
- f. Explore the viability of establishing multi-stakeholder portals for indigenous peoples at the national level.
- g. By 2005, relevant international organizations and financial institutions should develop their own strategies for the use of ICTs for sustainable development, including sustainable production and consumption patterns and as an effective instrument to help achieve the goals expressed in the United Nations Millennium Declaration.
- h. International organizations should publish, in their areas of competence, including on their website, reliable information submitted by relevant stakeholders on successful experiences of mainstreaming ICTs.
- i. Encourage a series of related measures, including, among other things: incubator schemes, venture capital investments (national and international), government investment funds (including micro-finance for Small, Medium-sized and Micro Enterprises (SMMEs), investment promotion strategies, software export support activities (trade counseling), support of research and development networks and software parks.

C2.	Information and communication infrastructure: an essential foundation for the Information Society
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9. Infrastructure is central in achieving the goal of digital inclusion, enabling universal, sustainable, ubiquitous and affordable access to ICTs by all, taking into account relevant solutions already in place in developing countries and countries with economies in transition, to provide sustainable connectivity and access to remote and marginalized areas at national and regional levels.
 - a. Governments should take action, in the framework of national development policies, in order to support an enabling and competitive environment for the necessary investment in ICT infrastructure and for the development of new services.
 - b. In the context of national e-strategies, devise appropriate universal access policies and strategies, and their means of implementation, in line with the indicative targets, and develop ICT connectivity indicators.
 - c. In the context of national e-strategies, provide and improve ICT connectivity for all schools, universities, health institutions, libraries, post offices, community centres, museums and other institutions accessible to the public, in line with the indicative targets.
 - d. Develop and strengthen national, regional and international broadband network infrastructure, including delivery by satellite and other systems, to help in providing the capacity to match the needs of countries and their citizens and for the delivery of new ICT-based services. Support technical, regulatory and operational studies by the International Telecommunication Union (ITU) and, as appropriate, other relevant international organizations in order to:

- i. broaden access to orbital resources, global frequency harmonization and global systems standardization;
 - ii. encourage public/private partnership;
 - iii. promote the provision of global high-speed satellite services for underserved areas such as remote and sparsely populated areas;
 - iv. explore other systems that can provide high-speed connectivity.
- e. In the context of national e-strategies, address the special requirements of older people, persons with disabilities, children, especially marginalized children and other disadvantaged and vulnerable groups, including by appropriate educational administrative and legislative measures to ensure their full inclusion in the Information Society.
 - f. Encourage the design and production of ICT equipment and services so that everyone, has easy and affordable access to them including older people, persons with disabilities, children, especially marginalized children, and other disadvantaged and vulnerable groups, and promote the development of technologies, applications, and content suited to their needs, guided by the Universal Design Principle and further enhanced by the use of assistive technologies.
 - g. In order to alleviate the challenges of illiteracy, develop affordable technologies and non-text based computer interfaces to facilitate people's access to ICT,
 - h. Undertake international research and development efforts aimed at making available adequate and affordable ICT equipment for end users.
 - i. Encourage the use of unused wireless capacity, including satellite, in developed countries and in particular in developing countries, to provide access in remote areas, especially in developing countries and countries with economies in transition, and to improve low-cost connectivity in developing countries. Special concern should be given to the Least Developed Countries in their efforts in establishing telecommunication infrastructure.
 - j. Optimize connectivity among major information networks by encouraging the creation and development of regional ICT backbones and Internet exchange points, to reduce interconnection costs and broaden network access.
 - k. Develop strategies for increasing affordable global connectivity, thereby facilitating improved access. Commercially negotiated Internet transit and interconnection costs should be oriented towards objective, transparent and non-discriminatory parameters, taking into account ongoing work on this subject.
 - l. Encourage and promote joint use of traditional media and new technologies.

C3. Access to information and knowledge
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- 10.** ICTs allow people, anywhere in the world, to access information and knowledge almost instantaneously. Individuals, organizations and communities should benefit from access to knowledge and information.
- a. Develop policy guidelines for the development and promotion of public domain information as an important international instrument promoting public access to information.
 - b. Governments are encouraged to provide adequate access through various communication resources, notably the Internet, to public official information. Establishing legislation on access to information and the preservation of public data, notably in the area of the new technologies, is encouraged.
 - c. Promote research and development to facilitate accessibility of ICTs for all, including disadvantaged, marginalized and vulnerable groups.
 - d. Governments, and other stakeholders, should establish sustainable multi-purpose com-

munity public access points, providing affordable or free-of-charge access for their citizens to the various communication resources, notably the Internet. These access points should, to the extent possible, have sufficient capacity to provide assistance to users, in libraries, educational institutions, public administrations, post offices or other public places, with special emphasis on rural and underserved areas, while respecting intellectual property rights (IPRs) and encouraging the use of information and sharing of knowledge.

- e. Encourage research and promote awareness among all stakeholders of the possibilities offered by different software models, and the means of their creation, including proprietary, open-source and free software, in order to increase competition, freedom of choice and affordability, and to enable all stakeholders to evaluate which solution best meets their requirements.
- f. Governments should actively promote the use of ICTs as a fundamental working tool by their citizens and local authorities. In this respect, the international community and other stakeholders should support capacity building for local authorities in the widespread use of ICTs as a means of improving local governance.
- g. Encourage research on the Information Society, including on innovative forms of networking, adaptation of ICT infrastructure, tools and applications that facilitate accessibility of ICTs for all, and disadvantaged groups in particular.
- h. Support the creation and development of a digital public library and archive services, adapted to the Information Society, including reviewing national library strategies and legislation, developing a global understanding of the need for "hybrid libraries", and fostering worldwide cooperation between libraries.
- i. Encourage initiatives to facilitate access, including free and affordable access to open access journals and books, and open archives for scientific information.
- j. Support research and development of the design of useful instruments for all stakeholders to foster increased awareness, assessment, and evaluation of different software models and licences, so as to ensure an optimal choice of appropriate software that will best contribute to achieving development goals within local conditions.

C4. Capacity building

- 11.** Everyone should have the necessary skills to benefit fully from the Information Society. Therefore capacity building and ICT literacy are essential. ICTs can contribute to achieving universal education worldwide, through delivery of education and training of teachers, and offering improved conditions for lifelong learning, encompassing people that are outside the formal education process, and improving professional skills.
- a. Develop domestic policies to ensure that ICTs are fully integrated in education and training at all levels, including in curriculum development, teacher training, institutional administration and management, and in support of the concept of lifelong learning.
 - b. Develop and promote programmes to eradicate illiteracy using ICTs at national, regional and international levels.
 - c. Promote e-literacy skills for all, for example by designing and offering courses for public administration, taking advantage of existing facilities such as libraries, multipurpose community centres, public access points and by establishing local ICT training centres with the cooperation of all stakeholders. Special attention should be paid to disadvantaged and vulnerable groups.
 - d. In the context of national educational policies, and taking into account the need to eradicate adult illiteracy, ensure that young people are equipped with knowledge and skills to use ICTs, including the capacity to analyse and treat information in creative and innovative ways, share their expertise and participate fully in the Information Society.
 - e. Governments, in cooperation with other stakeholders, should create programmes for capacity building with an emphasis on creating a critical mass of qualified and skilled ICT

professionals and experts.

- f. Develop pilot projects to demonstrate the impact of ICT-based alternative educational delivery systems, notably for achieving Education for All targets, including basic literacy targets.
- g. Work on removing the gender barriers to ICT education and training and promoting equal training opportunities in ICT-related fields for women and girls. Early intervention programmes in science and technology should target young girls with the aim of increasing the number of women in ICT careers. Promote the exchange of best practices on the integration of gender perspectives in ICT education.
- h. Empower local communities, especially those in rural and underserved areas, in ICT use and promote the production of useful and socially meaningful content for the benefit of all.
- i. Launch education and training programmes, where possible using information networks of traditional nomadic and indigenous peoples, which provide opportunities to fully participate in the Information Society.
- j. Design and implement regional and international cooperation activities to enhance the capacity, notably, of leaders and operational staff in developing countries and LDCs, to apply ICTs effectively in the whole range of educational activities. This should include delivery of education outside the educational structure, such as the workplace and at home.
- k. Design specific training programmes in the use of ICTs in order to meet the educational needs of information professionals, such as archivists, librarians, museum professionals, scientists, teachers, journalists, postal workers and other relevant professional groups. Training of information professionals should focus not only on new methods and techniques for the development and provision of information and communication services, but also on relevant management skills to ensure the best use of technologies. Training of teachers should focus on the technical aspects of ICTs, on development of content, and on the potential possibilities and challenges of ICTs.
- l. Develop distance learning, training and other forms of education and training as part of capacity building programmes. Give special attention to developing countries and especially LDCs in different levels of human resources development.
- m. Promote international and regional cooperation in the field of capacity building, including country programmes developed by the United Nations and its Specialized Agencies.
- n. Launch pilot projects to design new forms of ICT-based networking, linking education, training and research institutions between and among developed and developing countries and countries with economies in transition.
- o. Volunteering, if conducted in harmony with national policies and local cultures, can be a valuable asset for raising human capacity to make productive use of ICT tools and build a more inclusive Information Society. Activate volunteer programmes to provide capacity building on ICT for development, particularly in developing countries.
- p. Design programmes to train users to develop self-learning and self-development capacities.

C5. Building confidence and security in the use of ICTs
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12. Confidence and security are among the main pillars of the Information Society.

- a. Promote cooperation among the governments at the United Nations and with all stakeholders at other appropriate fora to enhance user confidence, build trust, and protect both data and network integrity; consider existing and potential threats to ICTs; and address other information security and network security issues.
- b. Governments, in cooperation with the private sector, should prevent, detect and respond to cyber-crime and misuse of ICTs by: developing guidelines that take into account ongoing

ing efforts in these areas; considering legislation that allows for effective investigation and prosecution of misuse; promoting effective mutual assistance efforts; strengthening institutional support at the international level for preventing, detecting and recovering from such incidents; and encouraging education and raising awareness.

- c. Governments, and other stakeholders, should actively promote user education and awareness about online privacy and the means of protecting privacy.
- d. Take appropriate action on spam at national and international levels.
- e. Encourage the domestic assessment of national law with a view to overcoming any obstacles to the effective use of electronic documents and transactions including electronic means of authentication.
- f. Further strengthen the trust and security framework with complementary and mutually reinforcing initiatives in the fields of security in the use of ICTs, with initiatives or guidelines with respect to rights to privacy, data and consumer protection.
- g. Share good practices in the field of information security and network security and encourage their use by all parties concerned.
- h. Invite interested countries to set up focal points for real-time incident handling and response, and develop a cooperative network between these focal points for sharing information and technologies on incident response.
- i. Encourage further development of secure and reliable applications to facilitate online transactions.
- j. Encourage interested countries to contribute actively to the ongoing United Nations activities to build confidence and security in the use of ICTs.

C6. Enabling environment

13. Confidence and security are among the main pillars of the Information Society.

- a. Governments should foster a supportive, transparent, pro-competitive and predictable policy, legal and regulatory framework, which provides the appropriate incentives to investment and community development in the Information Society.
- b. We ask the Secretary General of the United Nations to set up a working group on Internet governance, in an open and inclusive process that ensures a mechanism for the full and active participation of governments, the private sector and civil society from both developing and developed countries, involving relevant intergovernmental and international organizations and forums, to investigate and make proposals for action, as appropriate, on the governance of Internet by 2005. The group should, inter alia:
 - i. develop a working definition of Internet governance;
 - ii. identify the public policy issues that are relevant to Internet governance;
 - iii. develop a common understanding of the respective roles and responsibilities of governments, existing intergovernmental and international organisations and other forums as well as the private sector and civil society from both developing and developed countries;
 - iv. prepare a report on the results of this activity to be presented for consideration and appropriate action for the second phase of WSIS in Tunis in 2005.
- c. Governments are invited to:
 - i. facilitate the establishment of national and regional Internet Exchange Centres;
 - ii. manage or supervise, as appropriate, their respective country code top-level do-

main name (ccTLD);

- iii. promote awareness of the Internet.
- d. In cooperation with the relevant stakeholders, promote regional root servers and the use of internationalized domain names in order to overcome barriers to access.
- e. Governments should continue to update their domestic consumer protection laws to respond to the new requirements of the Information Society.
- f. Promote effective participation by developing countries and countries with economies in transition in international ICT forums and create opportunities for exchange of experience.
- g. Governments need to formulate national strategies, which include e-government strategies, to make public administration more transparent, efficient and democratic.
- h. Develop a framework for the secure storage and archival of documents and other electronic records of information.
- i. Governments and stakeholders should actively promote user education and awareness about online privacy and the means of protecting privacy.
- j. Invite stakeholders to ensure that practices designed to facilitate electronic commerce also permit consumers to have a choice as to whether or not to use electronic communication.
- k. Encourage the ongoing work in the area of effective dispute settlement systems, notably alternative dispute resolution (ADR), which can promote settlement of disputes.
- l. Governments, in collaboration with stakeholders, are encouraged to formulate conducive ICT policies that foster entrepreneurship, innovation and investment, and with particular reference to the promotion of participation by women.
- m. Recognising the economic potential of ICTs for Small and Medium-Sized Enterprises (SMEs), they should be assisted in increasing their competitiveness by streamlining administrative procedures, facilitating their access to capital and enhancing their capacity to participate in ICT-related projects.
- n. Governments should act as model users and early adopters of e-commerce in accordance with their level of socio-economic development.
- o. Governments, in cooperation with other stakeholders, should raise awareness of the importance of international interoperability standards for global e-commerce.
- p. Governments, in cooperation with other stakeholders, should promote the development and use of open, interoperable, non-discriminatory and demand-driven standards.
- q. ITU, pursuant to its treaty capacity, coordinates and allocates frequencies with the goal of facilitating ubiquitous and affordable access.
- r. Additional steps should be taken in ITU and other regional organisations to ensure rational, efficient and economical use of, and equitable access to, the radio-frequency spectrum by all countries, based on relevant international agreements.

C7. ICT applications: benefits in all aspects of life
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14. ICT applications can support sustainable development, in the fields of public administration, business, education and training, health, employment, environment, agriculture and science within the framework of national e-strategies. This would include actions within the following sectors:

15. E-government

- a. Implement e-government strategies focusing on applications aimed at innovating and pro-

19. E-employment

- a. Encourage the development of best practices for e-workers and e-employers built, at the national level, on principles of fairness and gender equality, respecting all relevant international norms.
- b. Promote new ways of organizing work and business with the aim of raising productivity, growth and well-being through investment in ICTs and human resources.
- c. Promote teleworking to allow citizens, particularly in the developing countries, LDCs, and small economies, to live in their societies and work anywhere, and to increase employment opportunities for women, and for those with disabilities. In promoting teleworking, special attention should be given to strategies promoting job creation and the retention of the skilled working force.
- d. Promote early intervention programmes in science and technology that should target young girls to increase the number of women in ICT carriers.

20. E-environment

- a. Governments, in cooperation with other stakeholders are encouraged to use and promote ICTs as an instrument for environmental protection and the sustainable use of natural resources.
- b. Government, civil society and the private sector are encouraged to initiate actions and implement projects and programmes for sustainable production and consumption and the environmentally safe disposal and recycling of discarded hardware and components used in ICTs.
- c. Establish monitoring systems, using ICTs, to forecast and monitor the impact of natural and man-made disasters, particularly in developing countries, LDCs and small economies.

21. E-agriculture

- a. Ensure the systematic dissemination of information using ICTs on agriculture, animal husbandry, fisheries, forestry and food, in order to provide ready access to comprehensive, up-to-date and detailed knowledge and information, particularly in rural areas.
- b. Public-private partnerships should seek to maximize the use of ICTs as an instrument to improve production (quantity and quality).

22. E-science

- a. Promote affordable and reliable high-speed Internet connection for all universities and research institutions to support their critical role in information and knowledge production, education and training, and to support the establishment of partnerships, cooperation and networking between these institutions.
- b. Promote electronic publishing, differential pricing and open access initiatives to make scientific information affordable and accessible in all countries on an equitable basis.
- c. Promote the use of peer-to-peer technology to share scientific knowledge and pre-prints and reprints written by scientific authors who have waived their right to payment.
- d. Promote the long-term systematic and efficient collection, dissemination and preservation of essential scientific digital data, for example, population and meteorological data in all countries.
- e. Promote principles and metadata standards to facilitate cooperation and effective use of collected scientific information and data as appropriate to conduct scientific research.

C8. Cultural diversity and identity, linguistic diversity and local content
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23. Cultural and linguistic diversity, while stimulating respect for cultural identity, traditions and religions, is essential to the development of an Information Society based on the dialogue among cultures and regional and international cooperation. It is an important factor for sustainable development.

- a. Create policies that support the respect, preservation, promotion and enhancement of cultural and linguistic diversity and cultural heritage within the Information Society, as reflected in relevant agreed United Nations documents, including UNESCO's Universal Declaration on Cultural Diversity. This includes encouraging governments to design cultural policies to promote the production of cultural, educational and scientific content and the development of local cultural industries suited to the linguistic and cultural context of the users.
- b. Develop national policies and laws to ensure that libraries, archives, museums and other cultural institutions can play their full role of content - including traditional knowledge - providers in the Information Society, more particularly by providing continued access to recorded information.
- c. Support efforts to develop and use ICTs for the preservation of natural and, cultural heritage, keeping it accessible as a living part of today's culture. This includes developing systems for ensuring continued access to archived digital information and multimedia content in digital repositories, and support archives, cultural collections and libraries as the memory of humankind.
- d. Develop and implement policies that preserve, affirm, respect and promote diversity of cultural expression and indigenous knowledge and traditions through the creation of varied information content and the use of different methods, including the digitization of the educational, scientific and cultural heritage.
- e. Support local content development, translation and adaptation, digital archives, and diverse forms of digital and traditional media by local authorities. These activities can also strengthen local and indigenous communities.
- f. Provide content that is relevant to the cultures and languages of individuals in the Information Society, through access to traditional and digital media services.
- g. Through public/private partnerships, foster the creation of varied local and national content, including that available in the language of users, and give recognition and support to ICT-based work in all artistic fields.
- h. Strengthen programmes focused on gender-sensitive curricula in formal and non-formal education for all and enhancing communication and media literacy for women with a view to building the capacity of girls and women to understand and to develop ICT content.
- i. Nurture the local capacity for the creation and distribution of software in local languages, as well as content that is relevant to different segments of population, including non-literate, persons with disabilities, disadvantaged and vulnerable groups especially in developing countries and countries with economies in transition.
- j. Give support to media based in local communities and support projects combining the use of traditional media and new technologies for their role in facilitating the use of local languages, for documenting and preserving local heritage, including landscape and biological diversity, and as a means to reach rural and isolated and nomadic communities.
- k. Enhance the capacity of indigenous peoples to develop content in their own languages.
- l. Cooperate with indigenous peoples and traditional communities to enable them to more effectively use and benefit from the use of their traditional knowledge in the Information Society.
- m. Exchange knowledge, experiences and best practices on policies and tools designed to promote cultural and linguistic diversity at regional and sub-regional levels. This can be

achieved by establishing regional, and sub-regional working groups on specific issues of this Plan of Action to foster integration efforts.

- n. Assess at the regional level the contribution of ICT to cultural exchange and interaction, and based on the outcome of this assessment, design relevant programmes.
- o. Governments, through public/private partnerships, should promote technologies and R&D programmes in such areas as translation, iconographies, voice-assisted services and the development of necessary hardware and a variety of software models, including proprietary, open source software and free software, such as standard character sets, language codes, electronic dictionaries, terminology and thesauri, multilingual search engines, machine translation tools, internationalized domain names, content referencing as well as general and application software.

C9. Media

24. Cultural and linguistic diversity, while stimulating respect for cultural identity, traditions and religions, is essential to the development of an Information Society based on the dialogue among cultures and regional and international cooperation. It is an important factor for sustainable development.

- a. Encourage the media - print and broadcast as well as new media - to continue to play an important role in the Information Society.
- b. Encourage the development of domestic legislation that guarantees the independence and plurality of the media.
- c. Take appropriate measures - consistent with freedom of expression - to combat illegal and harmful content in media content.
- d. Encourage media professionals in developed countries to establish partnerships and networks with the media in developing ones, especially in the field of training.
- e. Promote balanced and diverse portrayals of women and men by the media.
- f. Reduce international imbalances affecting the media, particularly as regards infrastructure, technical resources and the development of human skills, taking full advantage of ICT tools in this regard.
- g. Encourage traditional media to bridge the knowledge divide and to facilitate the flow of cultural content, particularly in rural areas.

C10. Ethical dimensions of the Information Society

25. The Information Society should be subject to universally held values and promote the common good and to prevent abusive uses of ICTs.

- a. Take steps to promote respect for peace and to uphold the fundamental values of freedom, equality, solidarity, tolerance, shared responsibility, and respect for nature.
- b. All stakeholders should increase their awareness of the ethical dimension of their use of ICTs.
- c. All actors in the Information Society should promote the common good, protect privacy and personal data and take appropriate actions and preventive measures, as determined by law, against abusive uses of ICTs such as illegal and other acts motivated by racism, racial discrimination, xenophobia, and related intolerance, hatred, violence, all forms of child abuse, including paedophilia and child pornography, and trafficking in, and exploitation of, human beings.
- d. Invite relevant stakeholders, especially the academia, to continue research on ethical di-

mensions of ICTs.

C11. International and regional cooperation

- 26.** International cooperation among all stakeholders is vital in implementation of this plan of action and needs to be strengthened with a view to promoting universal access and bridging the digital divide, inter alia, by provision of means of implementation
- a. Governments of developing countries should raise the relative priority of ICT projects in requests for international cooperation and assistance on infrastructure development projects from developed countries and international financial organizations.
 - b. Within the context of the UN's Global Compact and building upon the United Nations Millennium Declaration, build on and accelerate public-private partnerships, focusing on the use of ICT in development.
 - c. Invite international and regional organizations to mainstream ICTs in their work programmes and to assist all levels of developing countries, to be involved in the preparation and implementation of national action plans to support the fulfilment of the goals indicated in the declaration of principles and in this Plan of Action, taking into account the importance of regional initiatives.

D. Digital Solidarity Agenda

- 27.** The Digital Solidarity Agenda aims at putting in place the conditions for mobilizing human, financial and technological resources for inclusion of all men and women in the emerging Information Society. Close national, regional and international cooperation among all stakeholders in the implementation of this Agenda is vital. To overcome the digital divide, we need to use more efficiently existing approaches and mechanisms and fully explore new ones, in order to provide financing for the development of infrastructure, equipment, capacity building and content, which are essential for participation in the Information Society.

D1. Priorities and strategies

- a. National e-strategies should be made an integral part of national development plans, including Poverty Reduction Strategies.
- b. ICTs should be fully mainstreamed into strategies for Official Development Assistance (ODA) through more effective donor information-sharing and co-ordination, and through analysis and sharing of best practices and lessons learned from experience with ICT-for-development programmes.

D2. Mobilizing resources

- a. All countries and international organizations should act to create conditions conducive to increasing the availability and effective mobilization of resources for financing development as elaborated in the Monterrey Consensus.
- b. Developed countries should make concrete efforts to fulfil their international commitments to financing development including the Monterrey Consensus, in which developed countries that have not done so are urged to make concrete efforts towards the target of 0.7 per cent of gross national product (GNP) as ODA to developing countries and 0.15 to 0.20 per cent of GNP of developed countries to least developed countries.
- c. For those developing countries facing unsustainable debt burdens, we welcome initiatives that have been undertaken to reduce outstanding indebtedness and invite further national

and international measures in that regard, including, as appropriate, debt cancellation and other arrangements. Particular attention should be given to enhancing the Heavily Indebted Poor Countries initiative. These initiatives would release more resources that may be used for financing ICT for development projects.

- d. Recognizing the potential of ICT for development we furthermore advocate:
 - i. developing countries to increase their efforts to attract major private national and foreign investments for ICTs through the creation of a transparent, stable and predictable enabling investment environment;
 - ii. developed countries and international financial organisations to be responsive to the strategies and priorities of ICTs for development, mainstream ICTs in their work programmes, and assist developing countries and countries with economies in transition to prepare and implement their national e-strategies. Based on the priorities of national development plans and implementation of the above commitments, developed countries should increase their efforts to provide more financial resources to developing countries in harnessing ICTs for development;
 - iii. the private sector to contribute to the implementation of this Digital Solidarity Agenda.
- e. In our efforts to bridge the digital divide, we should promote, within our development co-operation, technical and financial assistance directed towards national and regional capacity building, technology transfer on mutually agreed terms, cooperation in R&D programmes and exchange of know-how.
- f. While all existing financial mechanisms should be fully exploited, a thorough review of their adequacy in meeting the challenges of ICT for development should be completed by the end of December 2004. This review shall be conducted by a Task Force under the auspices of the Secretary-General of the United Nations and submitted for consideration to the second phase of this summit. Based on the conclusion of the review, improvements and innovations of financing mechanisms will be considered including the effectiveness, the feasibility and the creation of a voluntary Digital Solidarity Fund, as mentioned in the Declaration of Principles.
- g. Countries should consider establishing national mechanisms to achieve universal access in both underserved rural and urban areas, in order to bridge the digital divide.

E. Follow-up and evaluation

- 28.** A realistic international performance evaluation and benchmarking (both qualitative and quantitative), through comparable statistical indicators and research results, should be developed to follow up the implementation of the objectives, goals and targets in the Plan of Action, taking into account different national circumstances.
- a. In cooperation with each country concerned, develop and launch a composite ICT Development (Digital Opportunity) Index. It could be published annually, or every two years, in an ICT Development Report. The index could show the statistics while the report would present analytical work on policies and their implementation, depending on national circumstances, including gender analysis.
 - b. Appropriate indicators and benchmarking, including community connectivity indicators, should clarify the magnitude of the digital divide, in both its domestic and international dimensions, and keep it under regular assessment, and tracking global progress in the use of ICTs to achieve internationally agreed development goals, including those of the Millennium Declaration.
 - c. International and regional organizations should assess and report regularly on universal accessibility of nations to ICTs, with the aim of creating equitable opportunities for the growth of ICT sectors of developing countries.
 - d. Gender-specific indicators on ICT use and needs should be developed, and measurable performance indicators should be identified to assess the impact of funded ICT projects on

the lives of women and girls.

- e. Develop and launch a website on best practices and success stories, based on a compilation of contributions from all stakeholders, in a concise, accessible and compelling format, following the internationally-recognized web accessibility standards. The website could be periodically updated and turned into a permanent experience-sharing exercise.
- f. All countries and regions should develop tools so as to provide statistical information on the Information Society, with basic indicators and analysis of its key dimensions. Priority should be given to setting up coherent and internationally comparable indicator systems, taking into account different levels of development.

F. Towards WSIS phase 2 (Tunis)

29. Recalling General Assembly Resolution 56/183 and taking into account the outcome of the Geneva phase of the WSIS, a preparatory meeting will be held in the first half of 2004 to review those issues of the Information Society which should form the focus of the Tunis phase of the WSIS and to agree on the structure of the preparatory process for the second phase. In line with the decision of this Summit concerning its Tunis phase, the second phase of the WSIS should consider, *inter alia*:

- a. Elaboration of final appropriate documents based on the outcome of the Geneva phase of the WSIS with a view to consolidating the process of building a global Information Society, and reducing the Digital Divide and transforming it into digital opportunities.
- b. Follow-up and implementation of the Geneva Plan of Action at national, regional and international levels, including the United Nations system, as part of an integrated and coordinated approach, calling upon the participation of all relevant stakeholders. This should take place, *inter alia*, through partnerships among stakeholders.
