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ECONOMIC STATISTICS: MEASURING THE INFORMATION SOCIETY

(Item 7 (d) of the provisional agenda)

**STATISTICAL IMPLICATIONS FOR THE ASIA-PACIFIC REGION OF THE
WORLD SUMMIT ON THE INFORMATION SOCIETY**

Note by the secretariat

SUMMARY

The World Summit on the Information Society was held in Geneva from 10 to 12 December 2003. A statistical side event was organized by the United Nations Economic Commission for Europe, the United Nations Conference on Trade and Development, the UNESCO Institute for Statistics, the International Telecommunication Union, the Organisation for Economic Cooperation and Development and the Statistical Office of the European Communities. From that meeting there emerged a number of presentations, discussions and proposals about measuring the information society. This paper aims to highlight concisely issues of particular importance for the Asia-Pacific region or more generally.

1. A meeting entitled “Monitoring the Information Society: Data, Measurement and Methods” was held in Geneva on 8 and 9 December 2003 as a side event of the World Summit on the Information Society. The Geneva meeting saw active participation from several countries and various international and regional organizations.¹ In particular, participation of countries from the ESCAP region was substantial: keynote papers were presented by participants from China, Malaysia and Thailand. A total of 13 countries from the ESCAP region attended the meeting and contributed actively to its work.

2. The meeting discussed several topics during the following substantive sessions:

- The role of information and communication technologies (ICT) in economic and societal transformations;
- The age of electronic business;
- People in the information society: individual and household use and penetration of ICT;
- ICT and society: measuring social impacts of ICT.

A number of conclusions were reached and several recommendations were issued. The final report of the Geneva meeting is annexed to this document for further reference. In order to avoid repetition, the focus of this paper will be on those issues particularly relevant for the Asia-Pacific region and those that are generally considered of great importance for all countries.

3. Significantly, the Geneva meeting was attended not only by statisticians but also by ICT experts, researchers and governmental agency executives. In some cases delegations included participants from both national statistical offices and ICT agencies, in other cases only national statistical offices or ICT or other agencies. This was appropriate since, although national statistical offices are in charge of collecting, processing and disseminating statistical information on a large number of subjects, this may not be the case for ICT statistics: competence on regulating and managing policies, the development of infrastructure and other crucial aspects of ICT, often including the responsibility for some statistical compilations, lies with agencies other than national statistical offices. Furthermore, it was felt throughout all the sessions of the meeting that the statistical measurement of the information society and of ICT should be strongly linked to policy issues. This underlines the requirement for practitioners of these subjects (statisticians, policy makers, ICT agency officials) at the national level to coordinate in order to respond to the need for quantitative information on ICT and the information society. A multidisciplinary approach is also required on the part of international and regional organizations, in order to obtain a full understanding of all issues and all points of views on the subject matter.

¹ All documents and the final report of the Geneva meeting, as annexed to this paper, are available at <http://www.unece.org/stats/documents/2003.12.wsis.htm>.

4. This has implications for work at both the national and international levels. The establishment of multidisciplinary national task forces for ICT and information society measurement would ensure the maximum exploitation of data already available; moreover, for international agencies such task forces would constitute the best national focal points, facilitating in this way the coordination and sharing of experiences. The Subcommittee may wish to comment on the desirability of establishing and institutionalizing such task forces for ICT and information society measurement. ESCAP members that have already set up similar coordination mechanisms may want to share their experience.

5. The Geneva meeting recalled that the “Fundamental Principles of Official Statistics”² are the foundation on which statistical organizations throughout the world should build their activity. It was emphasized that official statistics must be compiled according to scientific methods and internationally recognized classifications and definitions. Another aspect of the Principles worth considering concerns the potential breach of privacy and confidentiality when studying the usage of ICT by individuals and companies. The Principles state that “data for statistical purposes may be drawn from all types of sources, be they statistical surveys or administrative records....” and that “individual data collected by statistical agencies for statistical compilation, whether they refer to natural or legal persons, are to be strictly confidential and used exclusively for statistical purposes”. The Geneva meeting discussed how new techniques (software robots, for instance) could be used for monitoring individual usage of the Internet: the availability of these new techniques and the easier ways of matching individual records from different sources and databanks were emphasized as exciting possibilities for research on individual usage of ICT as well as potential sources of breach of privacy and confidentiality. Several participants recalled that a limit must be respected and that, although scientifically interesting, the analysis of individual behaviours on the Internet, or on the usage of ICT in general, should not violate the legitimate boundaries of personal privacy. The Subcommittee may wish to reaffirm that adherence to the Principles implies respect for the legitimate sphere of privacy and confidentiality of individuals and companies and that national legislation to that effect should be put in place, or extended as appropriate, to the measurement of ICT.

6. During the meetings some attention was devoted to presenting composite indices constructed for measuring the advance of informatization in a country or area. In China, for example, the International Statistical Information Center of the National Bureau of Statistics has computed an Informatization Index to analyse the internal digital divide and set appropriate policy responses. The International Telecommunication Union presented to the meeting its Digital Access Index, based on five categories and eight indicators. However, many more indices were, and will probably continue to be, created for the purpose of ICT measurement. These indices are sometimes seen as too subjective, especially in the attribution of the weights to average the various subcomponents on which they are

² Adopted at the special session of the United Nations Statistical Commission in 1994. See E/CN.3/1994/18.

based. At the Geneva meeting it was strongly emphasized that the need for measurement can be fully satisfied only by an internationally accepted and agreed framework of indicators, based on shared concepts and definitions. Composite indices may well be constructed and used for ICT measurement, provided that they are derived as objectively as possible and are used as a summarizing supplement of a broader and more analytical, internationally agreed framework of indicators. The Subcommittee may wish to review regional experiences with the use of composite indices and comment on the desired direction of the secretariat's further work towards identifying a common framework of indicators for the measurement of ICT and the information society.

7. Initiatives for promoting comparability of ICT measurement among countries in the Asia-Pacific region are already taking place. At the Geneva meeting the China Internet Network Information Center (CNNIC) informed participants of two symposia it had hosted in Beijing in July 2002 (International Symposium on the Technology of Internet Statistics and Research) and September 2003 (Symposium on Information Statistics of the Internet in the Asia-Pacific Region). During the second symposium, at the proposal of CNNIC, it was decided to establish the Asia-Pacific Internet Research Alliance (APIRA). Current members include the Internet regulatory bodies of Hong Kong, China; Macao, China; Taiwan Province of China; and the Republic of Korea. At the Geneva meeting, CNNIC invited other organizations engaged in Internet statistics and research in the Asia-Pacific region to join APIRA.

8. The Association of Southeast Asian Nations (ASEAN) had held an ASEAN Workshop on Measurement of the Digital Economy on 19 and 20 September 2002.³ The web site <<http://www.e-asean.info/sitemap.html>> is under construction, but some documents are already available online. ASEAN member countries look forward to the creation of a common framework of indicators for improving the comparability of their data. Moreover, they also look forward to collaborating with other initiatives in this area of work. The secretariat will continue to monitor regional initiatives that will contribute towards the creation of regional perspectives and frameworks of indicators for ICT measurement. Participants may wish to communicate to the secretariat other initiatives they are undertaking in this regard.

9. One of the issues raised at the Geneva meeting relates to the evolutionary nature of the information society. Measuring the information society has progressed from measuring penetration rates of ICT and traditional media (that is to say, measuring users) to measuring the type of usage and, when users and usage are known, the impact that ICT has on society. Therefore, it is important to recognize that the information society is a moving target. The consequence is that indicators that are meaningful for the earlier stages of an information society become less and less relevant when the development of ICT reaches higher levels. A framework of indicators will have to be flexible enough

³ See Zulfikar Mohammad Rachman, "ASEAN e-readiness assessment", at <<http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN011274.pdf>>.

to accommodate the information needs of various stages of ICT development in a society. Experience built on devising other frameworks of indicators, like that related to monitoring the achievement of the Millennium Development Goals, might help. The Geneva meeting suggested that work to identify a common set of indicators should build on already existing internationally accepted concepts and definitions.

10. Some discussion was devoted to reviewing the extent to which the digital divide is influenced by other socio-economic variables. It is necessary to make a distinction between the internal or national divide and the digital divide between countries or regions. In particular, with reference to the national divide, sex, age, social status, urban or rural residence, education and income are variables that are likely to influence and explain different ICT penetration rates within a country's population. It was noted that a statistical divide also exists between countries and that the availability of statistics on ICT and the information society, as in other fields of official statistics, tends to be greater in those countries with higher ICT penetration rates among their populations. It was also noted that different ICT penetration rates between men and women – the gender digital divide – are more noticeable in those countries where fewer data are available. However, profiling the users of ICT, and the usage they make of the technologies, is a necessary condition for Governments to design policies aimed at reducing the internal digital divide.

11. The meeting noted that two alternative approaches had been identified for collecting data on ICT users, usage and impact: by adding appropriate questions on ICT to existing surveys and by designing and implementing new specialized surveys. Of course, both these approaches can be used at the same time. The first alternative, the so-called incremental approach, offers the possibility of exploiting existing sampling frames and also of linking ICT to other socio-economic variables, obtaining in this way a socio-economic profile of ICT users. The second approach of new specialized surveys seems to be more convenient for evaluating and studying the usage and impact of ICT. In this regard, a very important issue to be considered, especially when using the incremental approach, is that of the age of ICT users. In some countries, experience suggests that potential ICT users are all individuals whose age is 6+, or even 3+ in the case of the United States of America. Surveys whose sample includes only adults are likely to miss some important ICT users. The age issue can be more easily taken into account in specific ICT surveys than in existing surveys.

12. Common to many developing countries is the issue of community access to ICT. Internet kiosks, for instance, allow multiple users to have access to the Internet; here it is easy to measure some variables, like the volume of data exchanged, but difficult to determine others, like the number of users. Community access is an issue of measurement likely to be of great importance for the Asia-Pacific region and should be investigated further in order to achieve more realistic estimates of ICT penetration rates among the non-urban and low-income populations.

13. The most important recommendation issued by the Geneva meeting was that “the five UN Regional Commissions should, in cooperation with competent regional organizations, commit themselves to organize in 2004, within each region, one ICT related meeting on the monitoring of information society issues. Both users and producers of official statistics should work together in organizing these meetings, which are intended to provide input for a global summary meeting in early 2005 (date and place to be determined) in order to prepare an action plan for the next WSIS Summit in Tunis.” While the secretariat has begun to prepare the background for such a meeting, and consideration of possible sources of funding has already begun, it is of great importance that the Subcommittee express its views on this matter and, if appropriate, voice its support and agreement that the secretariat pursue its work in this domain. The next session of the Commission, to be held at Shanghai, China, from 22 to 28 April 2004, will be the occasion to pursue the highest possible political and funding support from ESCAP members, donor countries and agencies.

14. In conclusion, the Subcommittee is invited to consider and offer its views on the following points:

- The measurement of ICT and of the information society should be policy-driven. Appropriate task forces at the national level that comprise statisticians, ICT officials of regulatory bodies and policy makers should address the issue of ICT and information society measurement at the national level and be the national focal point of a country;
- The Fundamental Principles of Official Statistics should be the foundation for statistical work in measuring ICT and the information society. The Principles should guide the work at the national and international levels with regard to issues such as the choice of scientific methods, internationally recognized classifications and definitions, and concerns about the privacy and confidentiality of individuals and companies;
- The measurement of ICT and the information society requires an internationally accepted and agreed framework of indicators, based on shared concepts and definitions. Composite indices, when designed according to scientific methods, especially in the selection of weights, could help to supplement and integrate a system of indicators for meeting the information needs of Governments;
- Regional initiatives on ICT measurement, such as those of APIRA and ASEAN, are welcome as they constitute a first step towards the harmonization of concepts and definitions and the identification of relevant issues for selected ESCAP subregions. The work of the secretariat should build upon these initiatives and involve the bodies concerned in its future activities;
- The information society and the access, usage and impacts of ICT change over time and with the level of development of a country. Therefore, any common, internationally

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agreed framework of indicators should be flexible enough to follow the different stages through which an information society evolves;

- Measures in this domain should be linked to other variables such as sex, age, social status, urban or rural residence, education and income which may facilitate the development of socio-economic profiles of ICT users. This will enable the design of policies aimed at reducing national digital divides;
- Surveys used to collect data on ICT and the information society can be specifically designed for this purpose, or data collection may exploit existing surveys by adding ICT-related questions or modules. A mixed approach may also be used. However, in designing or adapting surveys it is important to consider that the age of users to be surveyed might be significantly lower than in other domains;
- Appropriate measures of community access to ICT are very relevant for developing countries and of interest for the region;
- The work of the secretariat in the domain of measuring ICT and the information society will have to be part of a global effort that will culminate with the second phase of the World Summit on the Information Society (Tunis, 2005). The endorsement of member countries is needed in order to secure adequate funding and political support for secretariat initiatives.

Annex

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**Joint
UNECE/UNCTAD/UI
S/ITU/
OECD/Eurostat
Statistical Workshop
on Monitoring the
Information Society:
Data, Measurement
and Methods
(Geneva, 8-9
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REPORT

INTRODUCTION

1. Joint UNECE/UNCTAD/UIS/ITU/OECD/Eurostat Statistical Workshop: Monitoring the Information Society: Data, Measurement and Methods was held in Geneva on 8 and 9 December 2003. It was attended by Afghanistan, Albania, Armenia, Austria, Barbados, Belgium, Benin, Brazil, Bulgaria, Canada, Chile, China, Cuba, Czech Republic, Denmark, Ecuador, Egypt, Finland, France, Germany, Ghana, Haiti, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Lebanon, Lithuania, Luxembourg, Madagascar, Malaysia, Mexico, Morocco, Netherlands, Nigeria, Norway, Oman, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Republic of Moldova, Russian Federation, Rwanda, Senegal, Serbia and Montenegro, Slovakia, South Africa, Spain,

Sweden, Switzerland, Tanzania, Thailand, The former Yugoslav Republic of Macedonia, United Kingdom, United States of America, Uruguay, Zambia and Zimbabwe.

2. The Workshop was attended by representatives of the European Commission.
3. Representatives of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) and the United Nations Conference on Trade and Development (UNCTAD) attended the Workshop.
4. The following specialized agencies and intergovernmental organizations also attended the Workshop: Food and Agriculture Organization of the United Nations (FAO), International Telecommunication Union (ITU), Organization for Economic Cooperation and Development (OECD), World Trade Organization (WTO), UNESCO and UNESCO Institute for Statistics.
5. AFRISTAT also attended the Workshop.
6. The workshop adopted the provisional agenda.
7. Ms. Adelheid Bürgi-Schmelz (Switzerland), Director General of the Swiss Federal Statistical Office, was elected Chairperson and Mr. Eduardo Pereira Nunes (Brazil), President of the Brazilian Institute of Geography and Statistics vice Chairperson. As Ms. Bürgi-Schmelz could only take up office on 9 December the workshop agreed that Mr. Heinz Gilomen (Switzerland), Director of Society and Education Statistics of the Swiss Federal Statistical Office, would act on behalf of Ms. Bürgi-Schmelz on the first day of the Workshop.

ORGANIZATION OF THE WORKSHOP

8. The following substantive topics were discussed at the workshop on the basis of invited and supporting papers prepared and conference room documents that organisations had contributed:
 - Opening;
 - The Role of ICTs in Economic and Societal Transformations;
 - The Age of Electronic Business (1): current status of statistical measurements;
 - The Age of Electronic Business (2): ICT indicators for Development;
 - People in the Information Society: Individual and household use and penetration of ICTs: (1) ICT penetration and digital divide;
 - People in the Information Society: Individual and household use and penetration of ICTs: (2) Methods;
 - ICTs and Society: Measuring Social Impacts of ICTs;
 - Conclusions, adoption of the report and closing.

SUMMARY OF DISCUSSION AND THE MAIN CONCLUSIONS REACHED AT THE WORKSHOP

9. Conclusions and recommendations of the various sessions of the workshop are given below.

Opening session and session II

10. Official Statistics, Co-ordination, and Efficiency. The Workshop stressed that the *The Fundamental Principles of Official Statistics*, which were produced and adopted by the Conference of European Statisticians in 1992 and by the United Nations (UN) in 1994, should be the foundation on which statistical organisations throughout the world should build their activity. *The Fundamental Principles* emphasise that official statistics must be compiled according to scientific methods and internationally recognised classifications and definitions.

11. International organisations should ensure that the indicators and statistics used in the monitoring of other global programmes, e.g. the UN's Millennium Development Goals, can also be exploited in the monitoring process of the information society.

12. Systematic statistical monitoring requires organisation, co-ordination and division of responsibilities among international bodies. To avoid duplication of effort, an inventory of the information international organisations already possess, and of the recommendations that have been issued, should be prepared. This would facilitate the successful selection of core indicators, of all the possible available measures, which is the major challenge to the monitoring of the development of the information society.

13. While the OECD and Eurostat have done extensive work in monitoring the progress towards the information society, means are needed for international organizations to provide assistance to less developed countries in their development and compilation of basic statistics and of indicators describing the information society. There are also statistics from private sector organizations, but they do not always provide the same public disclosure of statistical methods that is fundamental in the production of official statistics

14. Information Society Indicators. The workshop noted that as from the second half of the 1990s the importance of ICT as an economic factor attracted greater attention. To this end the need for internationally comparable data on the information society became apparent and assumed a high priority.

15. The lack of comprehensive and internationally compatible data could pose serious problems in a rapidly changing and increasingly information-based world economy. Moreover, a common framework for indicators and standard definitions needs to be developed, tested and shared among countries for better understanding of technology diffusion and use, communication infrastructures, and services and content.

16. Attention was drawn to the activity-based definition for the ICT sector, which the OECD approved in 1998 and which has subsequently become an international standard.

17. The second thrust of the work to improve the measurement of ICT has concentrated on developing common methodologies to improve the international comparability of surveys that measure the use of ICT in households, businesses and government. A model questionnaire for measuring ICT usage in businesses was presented by the OECD in 2000, followed by one for households and individuals in 2002.

18. Given the clear need for more than one definition of electronic transactions, the OECD has developed a narrow one, based on electronic commerce restricted to the Internet, and a broader one that encompasses all computer-mediated networks.

19. The advent of official estimates of e-commerce had an important impact in terms of tempering the hype that surrounded e-commerce. While e-commerce was growing quickly, it was clear that the official estimates were significantly lower than the data being generated by private sector market research firms.

20. As the information society developed, attention was drawn to whether or not new determinants of growth such as ICT could explain an observed divergence in growth trends across countries during the 1990s. Work carried out by the OECD in this area concluded that no one factor can independently lead to superior growth, but rather it is the interaction of a constellation of events and conditions that led some countries to perform better than others. Sound monetary and fiscal policy, or well functioning labour markets, have been recognised for some time as fundamental requirements.

21. The OECD's work distinguished three ways in which the impacts ICT affect economic growth and business performance. Capital deepening through investment in ICT is important for economic growth. The second important economic impact of ICT is linked to having a sector producing ICT goods and services.

22. The third, and most crucial, impact of ICT that shows up at the aggregate level is the use of ICT. Several studies have examined the performance of those sectors of the economy that are intensive users of ICT. Many of these are located in the service sector, e.g. industries such as finance, business services and distribution. In some countries there is evidence that those sectors that have invested most in ICT, such as wholesale and retail trade, have experienced an increase in the overall efficiency of using labour and capital, or multifactor productivity growth. This could be because these sectors have received productivity gains from ICT use over and above the labour productivity gains they received from investment in ICT, for instance because of network effects.

23. The largest economic benefits of ICT are typically observed in countries with high levels of ICT diffusion. But having the equipment, or networks, is not enough to derive economic benefits. Other factors, such as the regulatory environment, the availability of appropriate skills, the ability to change organisational set-ups, as well as the strength of accompanying innovations in ICT applications, affect the ability of firms to make ICT effective in the workplace and seize the benefits of ICT.

24. Firm-level studies, based on longitudinal databases, also show that the use of ICT is part of a much broader range of changes that help firms to enhance performance. The impacts of ICT are not guaranteed, but depend on complementary investments, e.g. in appropriate

skills, and on organisational changes, such as new strategies, new business processes and new organisational structures.

25. Firm-level evidence also shows that ICT is no panacea. Firms may well over-invest in ICT, either in an effort to compensate for lack of skills or competitive pressure, or because they lack a clear market strategy.

26. What does the empirical evidence on the economic impacts of ICT imply for policy? The most important implication concerns the business environment. Governments should reduce unnecessary costs and regulatory burdens on firms to create a business environment that promotes productive investment.

27. An important challenge that has not yet been adequately addressed is to measure the impact of ICT beyond the economy and into society and culture.

28. Developing a Coherent Framework to Classify Indicators. A framework is required to provide a coherent structure for IS indicators and to link them to policy issues.

29. Within the framework, IS indicators can be classified as related to the:

- *Readiness* to use IS products, including the degree to which the labour force has acquired the appropriate skills
- *Intensity* of Use, or *Usage*, of IS products; and the
- *Impact* of using IS products.

30. The OECD has developed a framework as part of its IS statistical activity and this has been used by the ASEAN e-Measurement Workshop, which also took note of the e-Europe measurement framework. Thailand has taken the basic indicators for the OECD and ASEAN to arrive at 129 indicators. These initiatives show that there is work in progress.

31. A keynote address suggested using an agreed set of policy issues to develop a method of measuring the Information Society by classifying the policy issues by interest groups, and then assigning the individual indicators to these groups. For each indicator, an agreed convention on terminology and classification of the measurement would be required in order to standardize the work.

32. In practice, a country may regard some policy issues as not relevant to its development. For some LDCs, for example, there is no need to measure broadband access, or PKI because they are not yet priorities. On the other hand, there is no need to talk about basic telephone line penetration for highly advanced countries, which are already using broadband access and advanced mobile services.

33. In conclusion the Workshop recommended that:

- A framework and a set of indicators be brought forward to the next WSIS;

- The OECD continue to develop its IS framework, and related indicators, with its member and observer countries, the Voorburg Group and Eurostat, while taking note of work in other international organizations, such as the ASEAN;
- Best practices for measuring IS activities be shared by all international organizations, including definitions, software/statistical tools, model surveys, inventories of indicators and recommendations for their use, and means of capacity building;
- Regional organizations may further encourage the efficient statistical compilation of measurements by, for example, sharing a monitoring website and providing statistical and measurement training.

Session III

34. The session focused on the current status of statistical measurements of electronic business through two country experiences – Canada, an early innovator in this area and a catalyst for much of the international work undertaken at the OECD and Malaysia, a rapidly developing country whose economy is in the midst of a paradigm shift towards a “knowledge based” economy but whose statistical system is still rooted in an earlier stage of economic development.

35. While these two cases present rather different experiences, a number of elements are common to both. The first is the pervasive nature of the technology and its impact which is far broader than business and economics. The second is the difficulty of measuring this phenomenon with existing statistical tools and the need to adapt statistical systems and create new methods to adequately measure new business activity like e-commerce. In this regard, both speakers underscored the need for international co-operation and collaboration so that experiences can be shared and best practices identified.

36. Again, while the two countries are very different, they both face somewhat similar challenges as they work within their individual bureaucracies. Both face resource constraints that limits what can be done, both are striving to use the Internet as a tool for collecting data on e-business with perhaps more difficulty than expected but both are dedicated to deepening their efforts to better understand the transformation of the value-chain by ICT. Interestingly, while the Canadian system has made better progress in institutionalising the collection of eBusiness measures than in Malaysia, the Malaysian perspective argues for a fundamental re-thinking of the whole statistical system and as such is more holistic than incremental.

37. The main recommendations to emerge from the session include:

- Closely link data collection to analysis that uses the data to provide insight into policy issues of interest to policy makers and strategies of governments. This will help to build and sustain institutional support for official statistical work in this area;

- Deepen our understanding of e-business by moving beyond e-commerce and into the broader realm of e-business processes such as inventory control, supplier relations and customer management;
- Improve our methods for measuring the impacts of e-business and that these measures need to include sectors other than business like government.
- Work to adapt our measurement systems (e.g. classification systems) to better support information society statistical work;
- Collaborate across countries to share experiences, build statistical infrastructures together and identify best methods that can be shared. Included in this is how to use the Internet to facilitate data collection and reduce response burden; how to best use existing surveys and administrative data to obtain data while minimising burden and cost. In addition, countries should explore how to collectively measure the activity of multinational enterprises engaging in e-business which is currently beyond the reach of any one statistical agency. This can be done through bilateral exchanges, regional groups and through international statistical forums such as those hosted by the OECD, Eurostat and the UN Statistical Commission.
- Especially for developing countries this will require explicit training and knowledge-sharing sessions.

Session IV

38. All countries are concerned by the new technologies. They create new conditions of competition in numerous markets. They provide high-impact access possibilities for consumers and the public.

39. The new technologies constitute factors of potential development but also carry risks for businesses and individuals. They are of obvious importance to Governments.

40. In order to support their policies, Governments need indicators enabling them to assess the extent to which their countries are prepared to implement the new technologies (e-readiness), to observe the progress of implementation (e-intensity) and to measure the impact (e-impact) of their development on the course of business and on the population.

41. The role of statisticians is to propose statistical indicators that will meet their Government's expectations (and possibly other expectations) and can be achieved with an adequate degree of reliability. These indicators, however, may not necessarily come from surveys by national institutes of statistics if other sources can be exploited that meet the required conditions of reliability and availability for public statistics.

42. It is of primordial importance to identify the international comparability of the indicators in order to situate the country in relation to other comparable countries. For this reason indicators should preferably be selected among those already adopted internationally,

by OECD for example. The selection of indicators on the basis of regional consultations can, fortunately, marry the two objectives of international comparability and regional specificity.

43. The experience of developed countries and the most advanced developing countries in adopting new technologies shows that the statistical indicators to be constructed may, for example, be defined according to the following framework:

- Infrastructure
- Facilities and access costs
- Know-how and ICT use by the population
- Use of ICT in the health sector
- Use of ICT in the education system and its incorporation into teaching syllabuses
- Use of ICT by businesses
- Level of competence of the business workforce
- Development of e-commerce
- Use of ICT by administrations.

44. The choice of indicators must also take the national context into account in order to reflect the level of development, the country's economic profile and the typical lifestyle of its society. It is important here to note how developing countries lag behind and the frailty of their statistical system, and how as a result this hampers the implementation of international recommendations for collecting statistical data and following the development of new technologies. These recommendations should be adapted to take this handicap into account.

45. The main lines of this conclusion recall those of the expert meeting on measuring electronic commerce as an instrument for the development of the digital economy, organized by UNCTAD on 8 and 9 September 2003 and exclusively concerning the "business" aspect of the new technologies. The discussions on that occasion mainly concerned definitions, indicators, methods, survey formats and their adaptation to developing countries. The principal conclusions were the following:

- There is an urgent need to communicate ongoing work on electronic measurement (OECD and regional consultations) with the objective of harmonizing definitions, indicators and methods internationally, in order to obtain data that are country-to-country comparable.
- To start with, agreement would need to be reached on a first set of core indicators that all countries could calculate. These indicators would constitute the starting point for the creation of an international database on the capacity of households and enterprises to use the new technologies.
- The least developed countries need help in their efforts to design a means of keeping abreast of the penetration of new technologies and to adapt their statistical system accordingly. UNCTAD, in cooperation with other organizations such as ITU and OECD, is encouraged to participate in assisting them by supplying guidance and assistance to the least developed countries in the sphere of measurement and the statistical follow-up of the development of information and communications technologies.

- UNCTAD is invited to establish a forum (measuring-ict.unctad.org) to serve as a support for the exchange of information and experience between countries working on the development of their ICT statistics.

Session V

46. The Information Society involves myriad issues, including availability and access to ICT hardware, software and applications, amount and dexterity of usage, overall outcomes and longer-term impacts. However, at the end of the day, it is not about any of them alone. The Information Society has to be about people. After all, public policies, business strategies, and the measurements needed to guide them, are but intermediate steps for the only end goal admissible: people and our lives.

47. Therefore, the importance of meaningful, reliable and internationally comparable official measurements of ICT connectivity among people is both evident and paramount. Information on past, current and expected future access and utilization of ICTs is indispensable in the design, implementation and evaluation of rational and informed interventions. Central in all that is the issue of the Digital Divide. Simply put, we cannot move forward while leaving substantial masses of population behind – across countries or within.

48. The European Commission presented key policies and targets, as well as placed them in a macro perspective. It offered a hierarchy of measurements, starting from basic ICT access and moving to broadband. It also made the link between people's connectivity and policy priorities, such as e-government, e-businesses, e-learning and e-health. It emphasized that universal access is clearly an "economic necessity as well as a social goal".

49. The ITU paper made a well-documented case for the dire need of measurements. Not only "the statistical divide is as great as the digital divide", but it is widening. This is so due to the increasing inadequacy of traditional supply-side indicators and the need for new survey-based demand-side indicators, which are vital today to identify disparities, track progress and benchmark internationally. It clearly placed the priority on access and infrastructure data, while also exploring the potential of community indicators in the context of developing countries.

50. The discussion that followed reinforced the enormous gaps in the availability of statistics among nations and articulated the needed for immediate and concerted action. While ongoing efforts by the OECD and Eurostat over recent years were commended, and efforts at early stages in several countries in Asia and Latin America are encouraging, it was re-iterated that there is dearth of quantitative information in most developing nations. This limits severely the conduct of reliable and objective analyses of relative stages of development, and therefore relative needs, seriously hampers policy efforts and blindfolds decision makers. In view of the potential for paralysis from this situation, the session made the following recommendations.

51. The following recommendations and conclusions were made in session V of the workshop:

- Urgent need for assistance. There is an immediate need for financial resources and diffusion of expertise to developing nations to establish measurement programs aimed at producing official Information Society statistics as part of their national system, according to international standards and at regular intervals. Considering the nature of the informational needs, this refers chiefly to the establishment and carrying out of survey programs. While this need has been increasingly identified at the highest political levels, so far no resources have been allocated. The need is equally applicable to international bodies with responsibility to compile statistics for international comparisons, as well as extends to developed countries in order to solidify recent initiatives that serve as examples. After all, the value of information in an Information Society cannot be treated as an afterthought.
- Core Indicators. While the session did not produce a definitive list of indicators as such, it clearly identified priority areas of measurement. Penetration rates of older and new ICTs, including Internet users, among households and individuals are a must. These must be complemented with appropriate decompositions by socio-economic sub-group, particularly by income, age, gender, region (i.e. urban vs. rural), family type etc. Such statistics will help target policies to alleviate the digital divide. Following basic connectivity, and depending on the relative stage of development of different countries, measurements of actual usage of ICTs, including purpose, frequency and intensity, become more important. Practically, the two sets of indicators can be produced in parallel through the same survey vehicles. In addition to data, the dissemination of such information should include all pertinent metadata information as well.
- International collaboration should intensify to arrive at an agreed-upon set of core indicators that could be monitored across all nations and over time, built on already existing work. Every effort should be made to have such a list in place well before the Tunis Summit of 2005.
- International standards. As this is a new area, it becomes doubly important that new measurements are comparable internationally. For that, there is a need to solidify and diffuse existing standards, as well as intensify collaboration to produce and diffuse new ones.
- It is desirable that all along *harmonized concepts, definitions and methods*, developed within the framework of the *Fundamental Principles of Official Statistics*, are used so as to maximize the collective value of statistical outputs. The production by the OECD of the *Guide for Information Society Measurements* will help diffuse such standards, but more efforts through international collaboration will be needed to expand the scope of measurement activities, with appropriate adaptations for the context of developing nations as necessary. Input of other international organisations should be taken into account.

Session VI

52. Contributions in this session reiterated the need for a shortlist of common indicators with internationally shared definitions and compatible methodology, while recognising the primary duty of NSOs to provide data for national demands. Transparency of methodology is critical, and the case was strongly put for a co-ordinated approach by international organisations in this area.

53. Methods for monitoring how ICT affects people should be considered in the context of an 'adoption model', as suggested by OECD. This type of approach has a place for most measurement approaches:

- administrative or regulatory data;
- surveys of communication service suppliers;
- surveys of households or individuals as supplements to 'omnibus' or other survey vehicles;
- purpose designed stand-alone surveys.

54. Initial approaches to measuring new aspects of technology used in many countries have been based on adding limited numbers of questions to existing surveys because:

- large scale surveys are needed to obtain statistically valid results for estimates of phenomena during early adoption;
- this is the most cost effective route to begin measurement.

55. In choosing how to use survey vehicles it is essential to recognise differences between:

- surveys based on households, which can give information on access conditions, equipment and technology available to a group of people, and household spending
- surveys based on individuals, which can give information about use, attitudes, barriers, behaviour, personal expenditure and activity in the labour market.

56. To achieve best understanding of how ICT access and use affects social and economic behaviour, specialised surveys reflecting the position of individuals within households are the ideal. However most statistical organisations are not in a position to do this because it is resource intensive, or requires very well developed statistical infrastructure.

57. Use of different methods through the adoption process can be broadly summarised as follows:

- | | |
|--------------------------|--|
| Infrastructure readiness | - administrative / regulatory data on communications |
| Individual readiness | - household surveys of technology ownership |
| | - administrative data on other forms of access |
| | - individual surveys on attitudes / barriers |

Individual use	<ul style="list-style-type: none"> - communications provider surveys / admin data for aggregates - individual surveys on ICT use patterns and intensity
Individual impact	<ul style="list-style-type: none"> - surveys to link ICT use to changed time use - surveys linking to changed expenditure patterns - surveys linking to changed social or employment interaction

58. No national statistics organisation yet has an integrated approach to all of these, although those countries with comprehensive statistical infrastructure and population registers are able to approach it. The ability to be able to link data on ICT use to other information - not just on age / gender / income / household type, but also on aspects of economic and social behaviour - is of value to policymakers in analysing effects of ICT on society.

59. Methods for gathering information:

- *personal interviews*: used by many statistical offices, for accuracy, response and representative sampling
- *telephone interviews*: used by most private researchers, more efficient but may introduce lower response and sampling bias which is difficult to correct in new phenomena
- *computer based questionnaires*: very effective in understanding behaviour of a subset of the population, but can be self-selecting
- *ISP surveys*: low cost method for measurement of aggregates; degree of detail available depends on local regulatory structure
- *Internet traffic and web site analysis*: not as yet used by more than a few statistics organisations; work is needed, subject to privacy, confidentiality and security guarantees, to test how far this can supply low cost internet usage statistics.

60. Other sources and methods used in private sector surveys (e.g. logging activity in households using planted software) can give very detailed micro-data to help understand patterns of behaviour which is of commercial - and perhaps public - interest. As governments start to move towards targets for electronic delivery of services, these monitoring methods will be increasingly relevant.

Session VII

61. ICTs have far-reaching implications not just for the economic domain, but also for societies as a whole. Access to and use of ICTs should be viewed as means towards the improvement of quality of life, and not be considered ends themselves.

62. The issue of the Digital Divide has been a key driver behind the World Summit on the Information Society (WSIS). ICTs have the potential to provide new and exciting

opportunities to those who have access to them. However, ICTs also have the potential to accentuate existing economic imbalances and social inequalities. Access to equal opportunities is necessary to avoid creating an even bigger gap between the digital “haves” and “have-nots”. The Digital Divide is often used to distinguish between countries that have such access from those that do not. However, it is often factions within countries where the divide may be more pronounced (for example, for disadvantaged socio-economic groups or minority ethnic groups).

63. Thus, the digital divide should be analyzed:

- by using cross-national comparisons of ICTs indicators;
- by considering differences within countries using socio-economic break-downs such as by gender, income and education levels, urban/ rural geography, and ethnic background.

64. Session VII of the Workshop focused on two important social issues: the digital gap between men and women, and on education as one of the important sectors where data is needed to analyze the impacts of ICT.

65. In its deliberations, the Workshop recommended that further work towards measuring the Information Society should:

- encourage countries to collect data in the following areas: ICT infrastructure and usage (by individuals and households), barriers to use of ICTs, ICT skills, and purposes of ICT use - while ensuring the disaggregation of this data not only by gender but also by other socio-economic factors such as age, education and income levels, urban/ rural geography, and ethnic background.
- encourage countries to learn from experiences in other countries and to use conceptual and methodological work developed by those countries and by some international organizations. The varying capacities of some countries should be taken into account in such exercises.
- include, in international benchmarking exercises, indicators that measure the digital divide not only between countries but also within countries by providing analyses that use a variety of socio-economic factors.
- encourage the development of tools to measure the impacts of ICTs on the different social groups and regions within countries.

66. In the field of education the development of ICT indicators is not as advanced as in other fields. Serious information gaps exist regarding the role of ICTs in reshaping education to respond to the needs and challenges of the Information Society.

67. In its deliberations, the Workshop recommended that data collection in support of indicators for ICT and education should:

- be integrated within systems of official statistics; furthermore, it was recommended that educational policy-makers and administrators should be involved in this process.
- take notice of the indicators developed in the Performance Indicators Project within the Asian-Pacific network as a potential template for use by other similar initiatives in other parts of the world.

RECOMMENDATIONS

68. In concluding the Workshop, the following action plan was agreed upon:
- a) The five UN Regional Commissions should, in cooperation with competent regional organisations, commit themselves to organise in 2004, within each region, one ICT related meeting on the monitoring of information society issues. Both users and producers of official statistics, should work together in organizing these meetings, which are intended to provide input for a global summary meeting in early 2005 (date and place to be determined) in order to prepare an action plan for the next WSIS Summit in Tunis.
 - b) The items on the agenda could be more concrete on the demand for ICT statistics at national level (which ICT statistics are most relevant for national policy-makers and why they are relevant), and on how to best ensure that such statistics are produced as regular parts of official statistics. The set of indicators prepared by international organisations, their methods and logical guidelines for data collection, can be a starting point. It is, however, to be expected that country needs (and the limited statistical infrastructure of many countries) will require some adaptation.
 - c) Assistance from statistically advanced countries would be very welcome.
 - d) The regional meetings could be organised in conjunction with regular meetings on statistics or ICT in order to save resources.
 - e) UNCTAD would take the lead in coordinating with regional commissions and other regional groups, as well as the relevant international organizations any follow-up activities and serve as a focal point for the exchange of information in this meeting process.
 - f) Assuming that there will be a statistical side-event like this workshop that is being organised in conjunction with the Tunis Summit, the results of the regional meetings could be presented at such a meeting. If not, they would be presented to the UN Statistical Commission directly.
