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EMERGING AREAS OF PARTICULAR INTEREST TO MEASURE

1. Information Society and ICT sector is rapidly evolving. The deep knowledge of ICT sector is a powerful tool in order to be more competitive in this globalize world. Governments and enterprises are constantly adapting to the new evolutions. Being able to measure emerging markets within the ICT, may be a key issue to achieve more benefits for the society.
2. Therefore, a more in-depth analysis at these new markets is reflected in this annexes. The following section provides an overview of emerging areas in ICTs of special interest.



1: IMPROVING THE MEASUREMENT OF ICT AND ITS ROLE IN INNOVATION

3. Several international institutions –namely OECD, the European Commission and ITU– have been working on recommendations for improving the measurement of innovation, together with a number of countries and international organizations. The OECD published in September 2009 the first draft of the OCDE Innovation Strategy Policy Principles, which include recommendations for improving the measurement of innovation.
4. Improving the measure of ICT-related innovation is critical for policy making and evaluation, and for promoting Innovation in business, the public sector and society as a whole. We fully acknowledge the fact that innovation as a horizontal concept is directly connected, enabled or facilitated by the productive use of ICT and the development of the Information Society.
5. Yet, the current measures of ICT-related innovation fall short and do not adequately take account of the key role that it plays in today's economy.
6. There is a need to go beyond aggregate numbers or indices which do not adequately reflect the diversity and linkages surrounding ICT-related innovation actors and processes.
7. The OECD, the EC and other international institutions are working to develop a new set of indicators to examine the broader notion of innovation – going beyond R&D – and its impact on economic and social performance. This will enable a better assessment a nation's ICT-related innovation potential; help provide a more accurate picture of the strengths and weaknesses in a country's ICT system; and provide new tools for policy making and evaluation.
8. The following key actions to promote measurement of ICT-related innovation were identified in the document called "THE OECD INNOVATION STRATEGY: DRAFT POLICY PRINCIPLES (SG/INNOV(2009)4)":
 - Measure Investment in ICT-related innovation. Innovation results from a range of investments that go beyond R&D, such as software, training and new organisational structures, that now account for 5 to 12% of GDP. Measuring these investments is key to recognising that ICT innovation is central to economic growth.
 - Enhance the statistical infrastructure to measure innovation determinants and impacts. A wide range of official statistics is available and can be



better exploited to measure the determinants and impacts of ICT innovation. Turning this information into a valuable resource for policy will require improvements in data infrastructures, improved linkages between data sources and improved access to such data so they can be better explored.

- Measure ICT use, investment and innovation in and by the public sector. With the public sector under pressure to improve service delivery and outcomes, and reduce costs, measuring public sector ICT innovation and outcomes is critical. Measurement approaches developed for the business sector need to be clarified and redefined to apply to the public sector.
- Measure the outcomes of ICT innovation programs and investments. To ensure that ICT is contributing to well-being and progress, there is a need to best measure its economic and social impacts, such as its contribution to sustainability or to addressing a range of global challenges.
- Address new factors and drivers of innovation thanks to ICT: By nature, innovation implies new ways of creating value. Understanding the new dimensions of ICT-driven innovation will require flexible and adapted measurement tools. Emerging areas which require better measurement include user-driven innovation, enabling technologies, and innovation in the workplace thanks to a better, more productive use of ICT.

2: INDICATORS ON ICT AND CITIZENS' QUALITY OF LIFE

Towards a new measurement model

9. In addition to these proposed traditional indicators for measuring the Information Society, based on the metrics used to-date described in the proposal, we need to determine a series of indicators or measurements of how the Information Society is contributing to people's wellbeing. This can be measured in terms of material aspects, health, education, personal activities (including work) and socio-political aspects such as social connections and the environment, in line with projects currently run by the OECD to measure economic and social development.
10. This initiative was launched at the 3rd World Forum on Statistics, Knowledge and Policy in Korea by the OECD's Secretary General Mr. Gurría in October 2009.
11. Attention was drawn at this forum to the fact that the biggest challenge facing Governments and institutions today is the reduction of the existing difference between official statistics, based fundamentally on economic performance, and public perceptions of living conditions.
12. To reinforce this idea the OECD, at the request of French president Nicolas Sarkozy, created an international commission of experts in February 2008, to improve measurement techniques, paying more attention to social and environmental dimensions of economic development.
13. This panel, named the "Commission on Measurement of Economic Performance and Social Progress" or Stiglitz Commission after its president Joseph Stiglitz (U.S. economist, 2001 Nobel prize-winner and professor at the University of Columbia), drew up a series of recommendations necessary to obtain an adequate system of indicators that truly reflect wellbeing and social progress.
14. The main aim was to identify the limitations of GDP as an indicator of economic development and social progress. Problems of measurement were analysed, along with the mechanisms to determine additional information that might be necessary to produce relevant indicators on such social progress.
15. This OECD initiative should be taken into account, applying their general recommendations to the field of Information and Communication Technology (ICT) and the Information Society.
16. When the Avanza plan and its system of indicators was drawn up, a series of satisfaction indicators was defined aimed at measuring citizens' and companies'

perceptions regarding new technologies and their usefulness, although no such indicators are yet available at present.

17. To obtain an adequate system of indicators that correctly measures the state and the evolution of the ICT and Information Society sector, we need to apply the recommendations of the Stiglitz Commission to this field.
18. In order to do so, we need to define indicators that give more consideration to households and individuals. This measure should be based on indicators determining the income and the real ICT usage in this segment, as well as this income and usage broken down according to technology, equipment and ICT services. It is important to create indicators that relate this ICT usage and real household income to their disposable wealth.
19. It is also important to improve measures of the impact and integration of ICT in people's health, education, personal activity and environmental conditions, thus reflecting the importance of ICT for social wellbeing.
20. Indicators should be defined to evaluate inequalities in society in terms of ICT access and usage for households and individuals, reflecting their impact on their quality of life.
21. Official statistics should incorporate questions to evaluate people's quality of life, their experience and their priorities, to get subjective opinions about the influence ICT has on their lives.
22. Lastly, it is crucial we evaluate the role of the Information Society and ICT in sustainability¹, how ICT has both a profound effect on economic aspects of sustainability in a country regardless of social wellbeing and at the same time describe the indicators that measure the influence of ICT on physical or environmental aspects of sustainability.
23. Work is needed in all of these areas to obtain a metric with an adequate set of indicators, which genuinely provide information about wellbeing and society's level of satisfaction regarding ICT.

¹ Sustainability: Potential to achieve economic development with existing resources, without depleting them. This includes the challenge of determining whether the current level of wellbeing can be maintained by future generations with existing wealth levels, and is affected by the socio-economic model and the environmental models of different countries.

3: INDICATORS ON ICT AND GREEN GROWTH

International policy context

24. Information and communication technologies (ICTs) are a major factor in improving environmental performance and addressing climate change across the economy. Smarter and cleaner environmental and economic strategies will help tackle the challenge of global warming and environmental degradation and will contribute to “green growth” and a more sustainable economic recovery as outlined in the OECD Green Growth Strategy.

25. As governments attempt to promote sustainable (or “green”) pathways of the economic recovery, the issue area of ICTs, the environment and climate change (or “Green ICTs”) has greatly increased in importance with policy-makers. A few years ago, only a handful of governments had policy initiatives in this area (early initiatives were formulated in Japan, Korea, Denmark). But in recent years the number of initiatives have increased to cover a majority of OECD countries. The forthcoming OECD Information Technology Outlook 2010 shows that over half of respondents increased the prioritisation of “Green ICT” policies (preliminary findings). “Green ICT” policies include three issue dimensions:

- Reduce direct environmental impacts through sustainable use of ICTs (e.g. minimising energy use and reducing electronic waste; life-cycle approaches to ICT products),
- Maximise enabling impacts through the use of ICTs to reduce environmental footprints in other industry sectors and areas (e.g. “smart” electricity grids, transport systems and buildings; resource efficiency, tracking pollution, monitoring biodiversity),
- Understand and consider systemic impacts of ICT diffusion and their environmental implications (e.g. does more information lead individuals to adapt their behaviour and better conserve scarce resources? Does energy efficiency reduce absolute energy consumption or are there strong “rebound” effects?)

[From *OECD Information Technology Outlook 2010*, forthcoming; see also www.oecd.org/sti/ict/green-ict].

International policy examples

26. Direct environmental impacts

- Greening government ICT strategy (UK)
- Reduction of CO2 emissions of federal data centres, etc. (US)
- Green ICT procurement provisions (many OECD countries)
- “Green cloud computing” (KOR)

27. Enabling environmental impacts

- Smart grids policy initiatives increasing in OECD countries
 - a. E-energy (DE), Recovery Act (US), Smart Grid, Smart City (AUS) ...
- Beyond global warming
 - a. Water Information Networks and “smart” agricultural irrigation (AUS)
- National online waste management platform (POR)
 - a. Cross-discipline green R&D
- Research funding for Green ICT + Nano + Bio (DK)
 - a. Greener Pearl River Delta (Hong Kong + Guang Dong, China)

Measurement

28. The OECD report “MEASURING THE RELATIONSHIP BETWEEN ICT AND THE ENVIRONMENT” (June 2009) shows clearly that there is no separate statistical field that links data on ICTs and with that of environmental outcomes. Nevertheless, some data are available from official statistical sources, from analytical work and from product life cycle studies.

29. This report suggests a conceptual framework for the new statistical field “ICT and the environment” based on an existing OECD framework for Information Society statistics. Sources of official data to populate the framework are investigated and some relevant work has been identified. It is suggested that this field should be of more interest to official statisticians. A number of actions are recommended and they include: conducting new or expanded household and business surveys, expanding statistical classifications to better reflect ICT and the environment, ensuring that sample sizes are sufficient to enable better identification of ICT and environment data, and producing time series data on the topic.

OECD recommendation on ICTs and the environment



30. The OECD is developing a policy recommendation that has been forwarded for adoption by the OECD Council. Its ten principles also include a provision on improved measurement (full draft recommendation attached):
31. **"Measurement.** Encouraging development of comparable measures of the environmental impacts of ICT goods and services and ICT-enabled applications and among similar products. Improving understanding of the effects of government policies (information, incentives, regulations) in improving measurement tools and contributing to raising public awareness."

4: INDICATORS ON THE DEVELOPMENT OF E-GOVERNMENT

Background of eGovernment measurement

32. **eGovernment is a young policy area.** The first eGovernment Ministerial Declaration is only one decade old. We are still struggling for filling up the gaps of knowledge we have about how to develop public value oriented policies regarding with use of ICT by Public Administrations. Nevertheless and in spite of these drawbacks, ICT has become the fabric of the Governments in the XXI century and it is key element in the Public Sector reform, improving public services, more effective policies and the reinforcement of democracy².
33. **The European Union as a reference.** The European Union eGovernment measurement framework has been a reference for nearly a decade. Its sophistication model approach for the evaluation of eGovernment services has been internationally accepted. The yearly benchmarking has been the base of a continuous improvement in the EU eGovernment readiness³.
34. **The measurement of progress in eGovernment needs a renewed approach.** The currently used tools, Eurostat usage measurement and the benchmarking of 20 basic services, were designed following a web service delivery paradigm and the idea of a required direct contact of the citizen with the Government. While these tools have been valuable in the past, they have shown their shortcomings in the recent years⁴.

Principles for the renewal of eGovernment measurement framework

35. **An open measurement framework.** The renewal of the measurement framework should be based in the three openness principles: transparency, participation and collaboration. A transparent methodology developed following a participatory scheme and with a measurement based on the collaboration between the European Commission and the Member States is critical for strengthening European Union leadership in eGovernment measurement. It should be explored a more broad

² e-Government is the use of information and communication technologies in public administrations combined with organisational change and new skills in order to improve public services and democratic processes and strengthen support to public policies (European Commission, 2003)

³ Five out of the top ten countries in UN eGovernment readiness ranking are Member States.

⁴ Saturation of the 20 basic services measurement has been highlighted by many specialists and Eurostat usage indicator has been criticized in the report "i2010 eGovernment Action Plan Progress Study" (2009) requested and published by the European Commission

application of this openness principle in order to include other relevant stakeholders and create the widest sense of ownership of the measurement framework.

36. **Based on real needs.** The measurement of eGovernment is needed to identify the weaknesses and strengths but demands time and resources, both from the European Commission and Member States. The elements assessed in the framework should have a policy or legal basis, and either specifically or generally oriented to the improvement of the public sector and the creation of public value.
37. **Consideration of the complexities and specificities of Member States and its Public Administrations.** Each Member State has its own geographical, demographic, cultural and legal specificities. These national features, together with the different balance of powers between the Government tiers in each Member State and the need of separated information of each of them for an effective policy-making should be a reference in the renewal of eGovernment indicators.
38. **Strengthening the European Union leadership through cooperation with third parties.** Our eGovernment measurement methodologies have been a point of reference for third parties in the last decade. A close cooperation with OECD, United Nations the Partnership on Measuring ICT for Development, and other international institutions who promote other benchmarking initiatives in eGovernment or complement the existing ones is required to maintain our leadership. The definition of a homogenous eGovernment benchmarking standard will imply for Europe obtaining the benefits of an international comparison based on consensus.

Features of a renewed eGovernment measurement framework

39. **eGovernment as a mainstream policy.** The measurement of eGovernment should have a policy perspective. Policy-makers and citizens need information about the relation between the inputs, processes, outputs and outcomes of eGovernment policies to identify its value and understand its role in supporting the transition of Europe to a leading knowledge society.
40. **The constituent-driven perspective.** The improvement of the quality in serving the citizens and businesses is one of the key eGovernment aims. Therefore, besides the policy perspective, the measurement framework should capture as much as it is possible the fulfillment of the demand of personalization, inclusion and flexibility towards eGovernment.
41. **Quantitative comparability.** A renewed framework should provide the needed and objective information about efficiency and effectiveness of eGovernment policy-making across the different Member States of the Union. A collection of sound and

stable performance indicators are the basis to be capable to identify the leaders to learn from and to have a vision of our improvements.

42. **Qualitative insight.** Benchmarking should be based in quantitative indicators, but the qualitative insight is the cornerstone of benchlearning. Besides a stable collection of quantitative performance indicators, a renewed measurement framework should also support the learning process with the subjective perspective provided by researchers, the identification of best practices applied by the leaders and the exchange of experiences among the national experts. This qualitative insight should be based in an evolutionary approach depending on the continuous changes in ICT and in the service provision paradigms.

The development and governance of the renewed measurement framework

43. **A call for the renewal of the eGovernment measurement framework.** The value of the continuous benchmarking exercise is recognized in the Malmö Declaration on eGovernment approved unanimously last year, including an invitation to do a yearly measurement⁵. A refreshment of the benchmarking methodology has been done in 2010, we invite the European Commission to continue with the renewal of the current framework as an action point in the forthcoming Action Plan for 2011 to 2015. The renewal of the measurement framework should be one of the objectives set for 2011 for the Action Plan steering group⁶.
44. **A continuous assessment and follow-up of the measurement framework effectiveness.** We invite the Action Plan steering group to continuously assess the value of the framework, the effectiveness of its objectives and the improvement of its instruments. The analysis of the qualitative conclusions given by the measurement framework and its relation with its quantitative results, together with the information provided by other Information Society indicators, should be the basis of the tracking of the Action Plan done by the steering group.
45. **eGovernment measurement as an evolving area.** We are still learning to be able to capture the impact of eGovernment policies in other areas and the impact in strengthen their effectiveness. Equally, it is too early to capture the impact of the policies of open government based on ICT in building a more democratic society. We invite the European Commission to promote the design and development of tools for measuring outcomes of eGovernment policies and to ensure a close cooperation in the area with other relevant international organizations.

⁵ Malmö Ministerial Declaration on eGovernment, point 26a

⁶ The Action Plan steering group as it is defined in the Malmö Declaration (point 25).



46. The Partnership on Measuring ICT for Development has been requested by the UN Statistical Commission to develop a set of indicators for measuring e-government. The indicators, which are expected to be finalized in 2010, will complement the existing core list of 50 ICT indicators, which cover ICT infrastructure, ICT in households, ICT in business, the ICT sector, and ICT in education.

5: INDICATORS ON THE NEXT GENERATION ACCESS (NGA) NETWORKS

Metrics and Disclosure

47. **Issue:** Tracking progress toward national broadband goals requires accurate, consistent, and relevant measurements and methods. These measurements can be divided into two categories: (1) country-wide Top-level indicators such as number of households with broadband service available and (2) secondary-level metrics (service quality) specific to a given service offering, such as download/upload throughput, latency, and packet loss.
48. The International Telecommunication Union (ITU) defines, collects, harmonizes and disseminates a large number of telecommunication/ICT infrastructure data, including on fixed (wired) and wireless broadband. The broadband indicators, which have been revised by an international expert group in March 2010, are also included in the core list of indicators by the Partnership on Measuring ICT for Development.
49. In the future, these metrics may need to be expanded to include more in-depth and broader measurement as objectives are met and the goals evolve. In short, these are a “worldwide accepted starting point,” but should not limit countries using their own, expanded internal measurements.
50. **Objective:** A National Broadband Plan, at minimum, should include this recommended subset of Top-level internationally recognized indicators. Again, governments should establish SMART objectives for each of these ICT indicators, and an annual reporting program to track performance. For secondary-level metrics, the government should encourage voluntary industry-developed quality and performance metrics to track service quality improvements and/or degradations over time.
51. As a country’s broadband market matures, the government should determine baseline broadband performance metrics⁸ and facilitate meaningful, voluntary disclosure of material terms (such as actual upload/download speeds, price, packet loss, and latency). Broadband providers should give consumers meaningful data about service plans so that users can make informed service choices. Information about “up to” speeds is not sufficient and is unlikely to produce a transparent and competitive marketplace. The government encourage industry to create a voluntary system for gathering quality and performance metrics and disclosure of this information to consumers. Even countries with minimal broadband competition should



encourage a disclosure program to help promote acceptable quality of service and set a disclosure precedent for future market entrants.

Conclusion

52. Metrics and Disclosure:

- a. Establish objectives based on globally recognized metrics with defined timelines.
- b. Generate and publish yearly progress reports on goals.
- c. Promote voluntary methods and standard process for reporting service levels.

ITU Definitions of world telecommunication/ICT indicators, March 2010, available at http://www.itu.int/ITU-D/ict/material/TelecomICT%20Indicators%20Definition_March2010_for%20web.pdf

8 Depending on local circumstances, it may be appropriate for the government to determine separate baseline performance metrics for each of wireline, fixed wireless, and mobile wireless.