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Strengthening a Knowledge-Based Society¹

Background Paper – Panel 4

1. INTRODUCTION

The opening paragraphs of the *Geneva Declaration of Principles* (2003), agreed by world leaders at the World Summit on the Information Society (WSIS), recognized that education, knowledge, information and communication are at the core of human progress, endeavour and well-being. Leaders further recognized that Information and Communication Technologies (ICTs) have a growing impact on virtually all aspects of our modern-day lives. For developing economies, the growing availability and use of ICTs offer many new opportunities for global development. Specifically, ICTs can reduce traditional obstacles such as time, distance and other barriers to access to knowledge, making it possible to benefit millions of people in all corners of the world.

A number of studies has demonstrated that privatization and liberalization in the communication sector have benefits far beyond facilitating access to ICTs – greater availability of communications can also create economic and social benefits derived from the use of networks and services. In other words, broad access to ICTs, particularly when linked with capacity-building initiatives that promote ICT literacy, has amplifying effects across all socio-economic sectors. For this reason, developing countries need to consider the overall coherence of their national policies (for example, integrating digital connectivity and education initiatives) to support their broader development goals.

Building broad ICT literacy can enable citizens to access and contribute information, ideas and knowledge to create an inclusive Information Society. This includes sharing global knowledge for development in economic, social, political, health, cultural, educational and scientific

¹ This paper was prepared by Robert Shaw, Head, Human Capacity Building Division, ITU Telecommunication Development Bureau. Acknowledgement is made to Narine Abazian, ITU-D Working Group on Human Resources Development (WGHRD), for an unpublished draft contribution on ICT capacity building gaps in the CIS region. Appreciation is also expressed to Phillippa Biggs and Susan Teltcher for their useful comments on subsequent drafts.

activities. It also includes the creation of a rich public domain essential for building an educated public, new jobs, a culture of innovation, creation of business opportunities and the advancement of science.

The purpose of this Background Paper is to: a) briefly review the overall state of ICT development in CIS countries; b) review the concept of ICT literacy; c) provide a brief overview of related regional and international development initiatives; and, d) through examination of common elements of these initiatives, make a set of recommendations for consideration of participants in the *Connect CIS Summit*.

2. ICT DEVELOPMENT IN CIS COUNTRIES

An overview of the status of ICT development in CIS countries² can be provided by using the ITU ICT Development Index (IDI), an analytical tool that captures the level of advancement of ICTs in more than 150 countries worldwide. The 2009³ edition compares progress made by countries between 2002 and 2007. The IDI relies on three sub-indices (access, use, and skills) as shown in Figure 1Figure 1, to create an overall index that measures the global digital divide and how it has evolved in recent years.

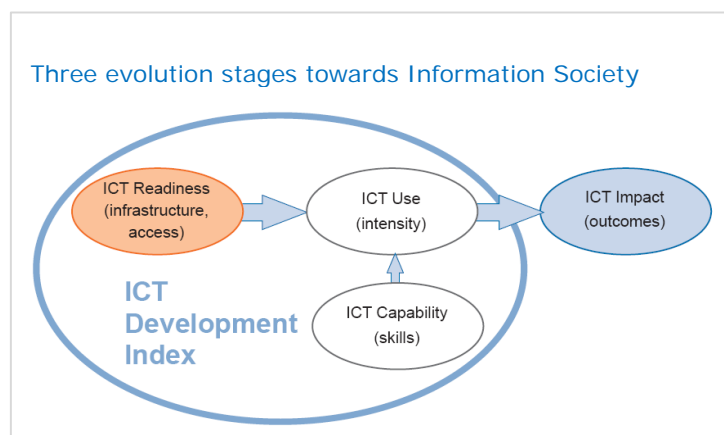


Figure 1

The IDI values for CIS countries in 2002 and 2007 and their rankings out of 154 countries are shown in Figure 2Figure 2 on page 3. The chart demonstrates there are significant gaps between the integrated rankings of CIS countries — ranging from rank 50 for the Russian Federation to rank 110 for Uzbekistan (where lower rankings indicate a higher level of ICT development). As a group, this puts CIS countries generally in a middle range of rankings, between high and low IDI rankings.

3. A CLOSER LOOK AT ICT LITERACY

The outputs of the WSIS on *capacity building* emphasized that each person should have the opportunity to acquire the necessary skills and knowledge in order to understand, participate actively in, and benefit fully from, the information society and knowledge economy. This is sometimes referred to as *ICT literacy*.

The IDI's ICT Capability (skills) sub-index shown in Figure 1Figure 1 is the closest approximation of a comparative ICT literacy measure. Figure 3Figure 3 on page 4 shows the ICT Capability (skills) sub-index for CIS countries and their rankings out of 154 countries. In

² For additional information on the ITU ICT Development Index (IDI) indicators for the CIS Region, see the *Information Society Statistical Profiles 2009* submitted to the Regional Preparatory Meeting for CIS Countries at: <http://www.itu.int/ITU-D/conferences/rpm/2009/index.html?Region=CIS>.

³ <http://www.itu.int/ITU-D/ict/publications/idi/2009/index.html>

this sub-index, CIS countries generally fared better in their overall rankings vis-à-vis other countries than in their overall IDI rankings shown in Figure 2. For example, Ukraine, Belarus, Russian Federation and Kazakhstan all having rankings in the top 50. These higher rankings are undoubtedly due to the nature of the underlying indicators used to establish the IDI ICT Capability (skills) sub-index (adult literacy and school enrolment), which have long been prioritized on the national policy agenda of CIS countries.

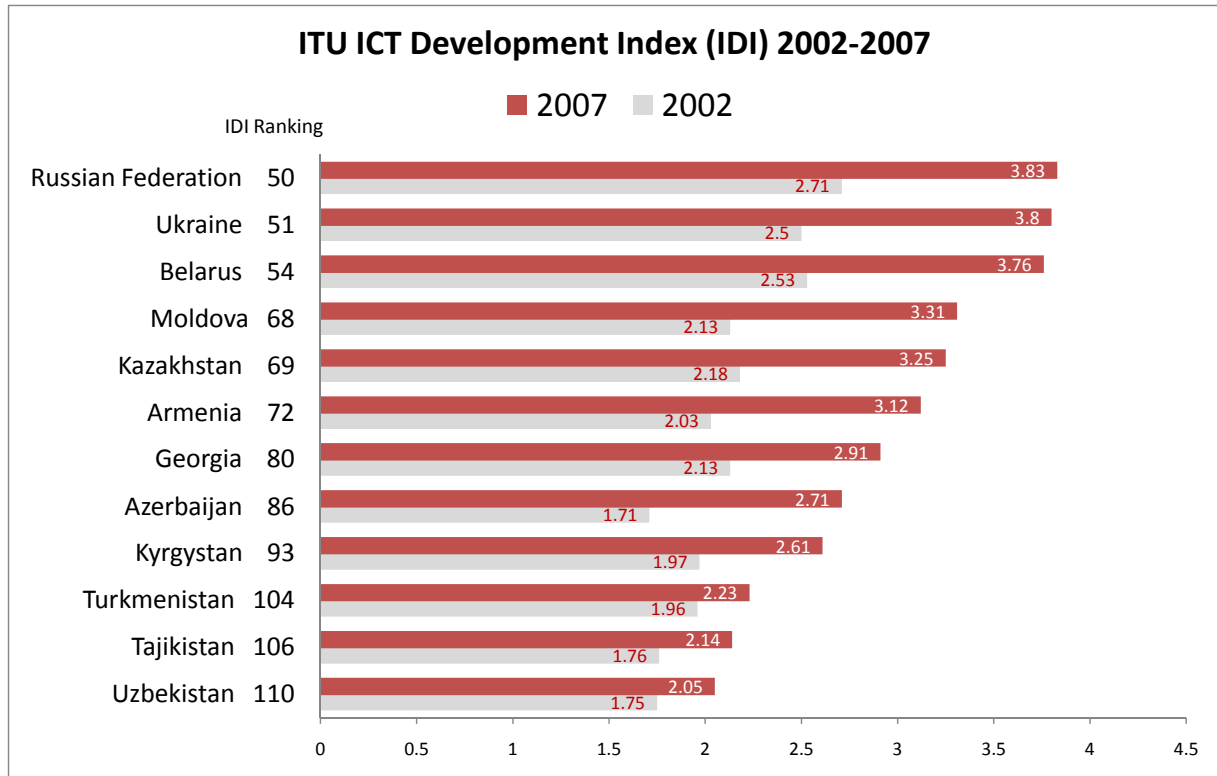


Figure 2

As the IDI's ICT Capability (skills) sub-index is only an approximation of ICT literacy on available data, it is perhaps useful to consider more carefully the question: "what is ICT literacy?"

In 2001, the Educational Testing Service (ETS)⁴ convened an international panel comprised of academics, development specialists, and telecommunication experts representing the governmental and private sectors "to study the growing importance of existing and emerging ICTs and their relationship to literacy". In a report released in 2003, *Transformation: A Framework for ICT Literacy*⁵, ICT literacy was defined by ETS as the ability to use "digital technology,

"to become fully-fledged members of the information society...depends largely on increased capacity building in the areas of education, technology know-how and access to information, which are major factors in determining development and competitiveness"

WORLD SUMMIT ON THE INFORMATION SOCIETY 2003/2005

⁴ A non-profit organization with a mission of advancing the quality and equity in education for all people worldwide.

⁵ <http://www.ets.org/ictliteracy/digital1.html>.

communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society”.

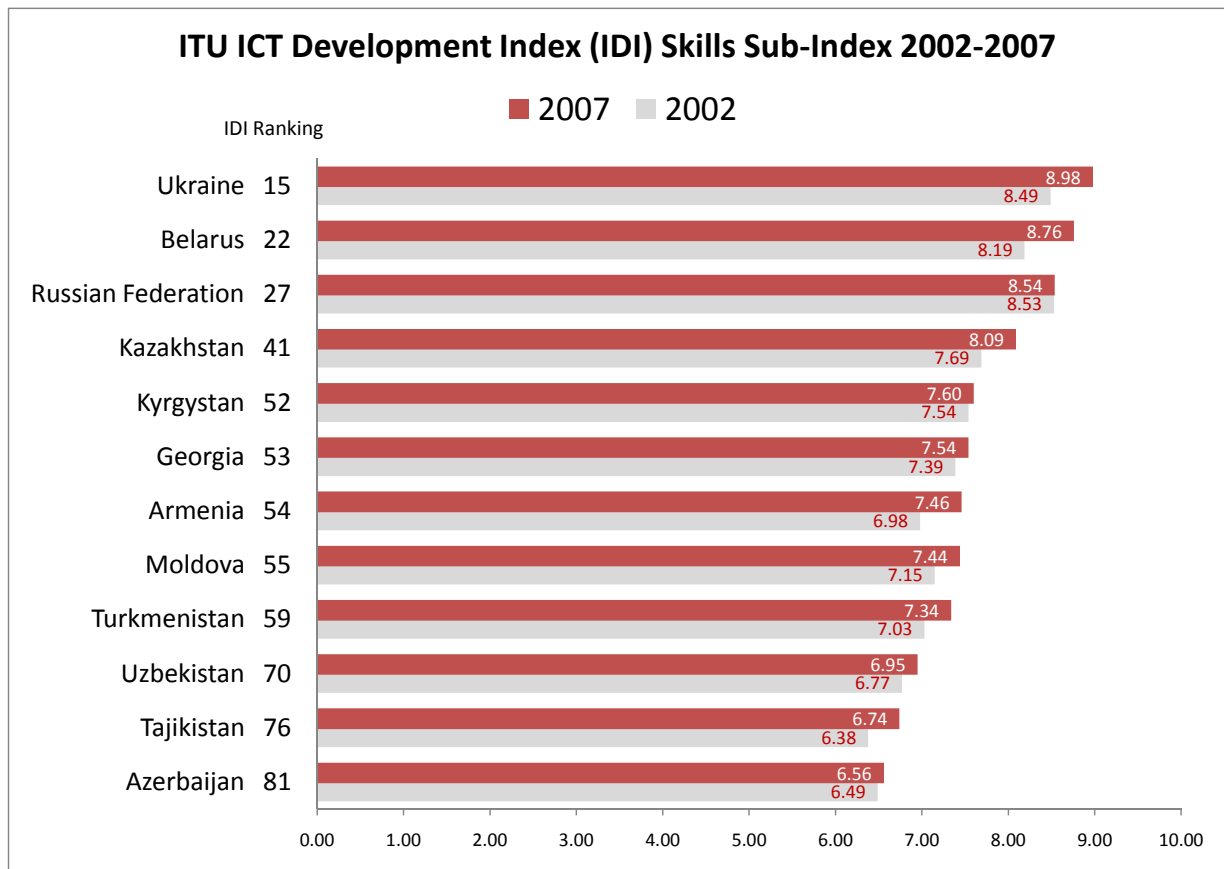


Figure 3

In this context, ICT literacy can perhaps be best seen as a continuum of skills and abilities. A recent study on promoting ICT literacy⁶ from UNESCO (2008) described such a continuum:

- A *knowledge dimension* characterized by a user's *awareness* of ICTs and *appreciation* of the relevance of ICTs in both her/his personal and professional life. This includes familiarity with the technologies and understanding how these are actually or can be potentially beneficial to his or her own and other people's lives.
- A *skills dimension* resulting from the use of or experience with technologies. The abilities "to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in networks via the Internet"⁷ are hallmarks of an ICT-literate individual.

⁶ See *Strategy Framework for Promoting ICT Literacy in the Asia Pacific Region*, UNESCO, 2008

⁷ European Commission, Directorate for Education and Culture, *Implementation of 'Education and Training 2010' Work Programme: Key Competencies for Lifelong Learning, A European Reference Framework*, November 2004

- Reflecting a higher level of ICT literacy than either the *knowledge* or *skills* dimensions above, the *attitude dimension* represents a person's *critical assessment* of his or her use of ICTs for information and knowledge. The continued and ongoing use of ICTs increases and deepens the user's *critical reading of information and knowledge* that is accessed, managed, integrated, created, and communicated through ICTs.

It is difficult with available data to make any precise assessments of the gaps between supply and demand for ICT knowledge and skills in CIS countries. However, surveys of human resource managers and anecdotal evidence suggest that industry needs for qualified staff are not being met. Employers and recruitment experts often state that recent graduates do not have the necessary skills or qualifications needed in the marketplace. To address this gap, some companies have launched their own initiatives, sometimes in partnerships with universities, to produce more qualified staff and enhance staff skills (see Box 1 on MTS).

To be fair, many of the problems that CIS countries face in skills shortages are the same as other countries - in the rapidly-evolving and competitive environment of ICT convergence, the need for specific skills sets are constantly changing — which can lead to a misalignment between traditional public educational curricula and market needs in the ICT sector.

To further improve their levels of ICT development, further efforts in CIS countries are needed to

raise general ICT literacy and promote the development of ICT specialized skills. First steps include universal primary education and raising general knowledge and skills in the use of ICTs. Providing connectivity to schools⁸ and leveraging the use of ICTs in all stages of education, training and human resource development is also integral to this process. More focused ICT specialized education and training (which included lifelong learning) needs to address a broad range of specialized topics — ranging from training for government ICT policy-makers and regulators, to professional business-focused curricula for ICT executives and managers, to programmes for technical and operational staff. Given a growing demand for a wide range of ICT and information specialists and rapid changes in needed competencies, supporting and building ICT instructional institutional capacity will require particular efforts. This is discussed in more detail in Section 4 below.

Box 1: MTS Initiative to Build Staff Skills

Mobile TeleSystems OJSC (MTS) is the largest mobile phone operator in Russia and the CIS with over 90 million subscribers (2008) in Russia, Ukraine, Uzbekistan, Turkmenistan, Armenia and Belarus. To meet demands for qualified staff, MTS has developed programmes such as "Professionals of the Future" which supports students studying telecommunications in technical universities through grants and prizes. It has also developed an internship programme to give young students experience working in a commercial context. These two programmes demonstrate that close cooperation between universities and the ICT industry is critical to bridging the gap between skills supply and demand.

⁸ World leaders participating in WSIS set a goal of providing connectivity for all primary, secondary and tertiary schools by 2015. Providing universal primary education and increased literacy rates, both which can be facilitated through ICTs, are also key objectives of the United Nations Millennium Development Goals (MDGs). For related information on ITU's *Connect a School, Connect a Community* initiative, see the separate paper on this topic submitted to the *Connect CIS Summit*.

4. SPECIFIC INITIATIVES

Given the growing demand for a wide range of ICT and information specialists and rapid changes in the competencies required, building ICT instructional institutional capacity has been the focus of a number of activities in CIS countries. Some of the related initiatives include: a) development of new ICT curricula and delivery mechanisms (e.g., use of distance learning); b) innovation in curricula development; c) support for ICT science and research; d) accreditation and certification improvements using regional and international standards; e) quality assurance and monitoring; f) closer relationships between universities and the ICT industry to adapt to skill sets needs; and g) lifelong learning opportunities for adults. Some related regional and international initiatives that relate to these domains are discussed below.

Regional Commonwealth in the field of Communications (RCC)

The Regional Commonwealth in the field of Communications (RCC)⁹ has established a Commission on Human Resources Development (HRD) which has recently made a number of specific recommendations on improvement of ICT skills and competencies in CIS countries, including:

- participating in initiatives to improve educational systems, including higher and executive education in the sphere of ICTs;
- to integrate training in ICTs into national educational initiatives;
- to develop new education curricula in ICTs in line with international standards, in cooperation with the private sector;
- to promote the inclusion of 'infocommunication courses' in universities in RCC countries;
- to introduce and widely use distance learning in educational systems.

During the 19th RCC HRD Commission Meeting, held in October 2008 in Armenia, the representative of the Russian Federation presented a draft Curriculum for an InfoCommunication Course and ICT Education Standards, with the aim of the development of a single education space for participating RCC countries. At this meeting, the RCC Executive Committee Meeting requested the RCC HRD Commission to prepare proposals and an action plan on human capacity-building initiatives, including distance learning activities.

International Rectors' Conference of Telecommunication Universities (IRCTU)

In April 2008, the first meeting of the International Rectors' Conference of Telecommunication Universities (IRCTU) was held in Ukraine¹⁰. The meeting was held at the Odessa National A.S. Popov Academy of Telecommunications (ONAT). 18 University Rectors from 13 countries participated in the event including Ukraine, the Russian Federation, Belarus, Slovakia, Germany, Latvia, Poland, Moldova, Azerbaijan, Georgia, Kazakhstan, Uzbekistan and Syria.

The main objectives of this annual Conference include:

- The development of recommendations for finding of basic principles and policy in higher education, aimed at further modernization of science and training process;

⁹ <http://www.rcc.org.ru>

¹⁰ http://www.onat.edu.ua/?set_lang=en&pg=mezhd_konfer. The declaration from the meeting (Russian) can be found at http://www.onat.edu.ua/dif_files/mezhd_konfer/declaration_ru.pdf

- Coordination of complex scientific programs, assistance in making use of its results in industrial and social spheres, and developing students' scientific works;
- Holding of conferences, seminars and other scientific and education workshops for skills improvement of the universities' academic and other staff.
- Strengthening of ties between universities, private and non-private organizations connected with students' practical training and graduate employment;
- Promotion of strengthening and developing of direct international ties between universities;
- Providing Conference members with information exchange and consulting on national and international achievements in the telecommunications sphere.

The second meeting of IRCTU took place in April 2009 in Kazakhstan at the Academy of Transport and Communications¹¹.

Bologna Process

The Bologna Process¹² is named after the Bologna Declaration, signed in the Italian city of Bologna in June 1999 by Ministers in charge of higher education from 29 European countries. Today, the Bologna Process unites 46 countries¹³ party to the European Cultural Convention¹⁴ and committed to the goals of the European Higher Education Area (EHEA). The proposed EHEA would be based on international cooperation and academic exchange that should make it more attractive to European students and staff as well as to students and staff from other parts of the world. This envisaged European Higher Education Area would:

- facilitate mobility of students, graduates and higher education staff;
- prepare students for their future careers and for life as active citizens in democratic societies, and support their personal development; and
- offer broad access to high-quality higher education, based on democratic principles and academic freedom.

Notably, the Bologna Process includes 6 CIS countries: Armenia, Azerbaijan, Georgia, Moldova, the Russian Federation and Ukraine.

Tempus

Tempus¹⁵ is a European Union programme supporting the modernization of higher education in Partner Countries of Eastern Europe, Central Asia, the Western Balkans and the Mediterranean region, mainly through university cooperation projects. The overall objective of Tempus is to contribute to the creation of an area of cooperation in the field of higher education between the European Union and Partner Countries in the countries neighbouring the EU. For example, in the area of ICTs, the Tempus initiative «Changes in the ICT curricula

¹¹ <http://www.old.rcc.org.ru/en/2/2-11.htm>

¹² <http://www.ond.vlaanderen.be/hogeronderwijs/bologna/>

¹³ <http://www.ond.vlaanderen.be/hogeronderwijs/bologna/pcao/index.htm>

¹⁴ http://www.coe.int/t/dg4/culturalconvention/default_en.asp

¹⁵ <http://eacea.ec.europa.eu/tempus/>

in Lisbon perspective» was started at Povolzhskiy State University of Telecommunications and Informatics¹⁶ (of the Russian Federation) in February 2008. This project seeks to establish curricula for a Bachelors of ICT, which will be carried out in educational institutions signed under Bologna Convention. A similar contract has been signed with Siberian State University of Telecommunications and Informatics¹⁷ for a joint TEMPUS - TACIS project to develop a "Master degree program in telecommunication and communication technologies".

UNESCO Higher Education Initiatives

The UNESCO Higher Education initiative¹⁸ deals with cross-border higher education and quality assurance, with a special focus on mobility and recognition of qualifications. UNESCO promotes policy dialogue and contributes to enhancing quality education, strengthening research capacities in higher education institutions, and knowledge sharing across borders. Specific sub-themes address:

- Reform;
- International University Cooperation;
- Quality Assurance and Recognition;
- Teacher Education;
- Higher Education and ICTs;
- UNESCO Forum on Higher Education, Research and Knowledge; and
- UNESCO Portal on Higher Education Institutions.

At the last UNESCO World Conference on Higher Education held in July 2009, the Meeting Communiqué¹⁹ included a number of specific references to the potential benefits of the use of ICTs for development in education:

- "ODL [Open and Distance Learning] approaches and ICTs present opportunities to widen access to quality education, particularly when Open Educational Resources are readily shared by many countries and higher education institutions".
- "The application of ICTs to teaching and learning has great potential to increase access, quality and success. In order to ensure that the introduction of ICTs adds value, institutions and governments should work together to pool experience, develop policies and strengthen infrastructure, especially bandwidth".
- "The results of scientific research should be made more available through ICTs in addition to open access to scientific literature".
- Member States, working in collaboration with all stakeholders, should develop policies and strategies at system and institutional levels to "support the fuller integration of ICTs and promote Open and Distance Learning (ODL) to meet increasing demand for higher education."

¹⁶ <http://www.oren-psati.ru>

¹⁷ <http://www.sibsutis.ru>

¹⁸ <http://www.unesco.org/en/higher-education>

¹⁹ http://www.unesco.org/fileadmin/MULTIMEDIA/HQ/ED/ED/pdf/WCHE_2009/FINAL%20COMMUNIQUE%20WCHE%202009.pdf

ITU

The ITU is the lead UN agency for ICT issues and an important source for training, education and information in this field. This position of leadership carries with it a responsibility that training, education and information of the utmost quality is available worldwide, and represents the cutting edge of rapidly-emerging technologies and latest changes in the sector. In order to meet this expectation, education and training need to take advantage of the most current methods and means of delivery, while taking into account that in some areas of the world, access to the necessary equipment and technology may be limited. In an effort to streamline its numerous capacity-building efforts in the area of ICTs and telecommunications, the ITU recently established the *ITU Academy*. The overall vision of the ITU Academy is to strengthen the human, institutional and organizational capacity of developing countries by making available ICT learning and development opportunities with the highest possible quality.

The ITU Academy portal²⁰, which is under development, will provide a common platform and repository of ICT and telecommunication training materials developed and delivered by the ITU Development Sector, as well as eventually giving a single entry point into all capacity-building activities (see [Figure 4](#)). The Academy is layered on a professional Learning Management System and supports multiple languages, social networking and collaboration tools.

In its learning and development activities, the ITU collaborates in the regions with a number of public and private sector partners. Today, the ITU Academy network of training partners numbers approximately 60 Centres of Excellence²¹ around the globe which are institutions sharing expertise, resources and capacity-building know-how in telecommunications and ICT training/education, alongside some 75 Internet Training Centres²² which help developing countries meet their human resource requirements for skilled Internet and "new economy" professionals through technical Internet and IP-related training programmes.



Figure 4

In the CIS region, ITU Academy partners include the 4 Centres of Excellence and 7 Internet Training Centres listed below:

Centres of Excellence

- Higher State College of Communications (HSCC), Belarus;
- Kazakh Infocommunication Academy (KAI), Kazakhstan;
- Moscow Technical University of Communications and Informatics (MTUCI), the Russian Federation; and
- Ukrainian State Centre of Radio Frequencies (UCRF), Ukraine.

²⁰ <http://academy.itu.int>

²¹ <http://academy.itu.int/mod/resource/view.php?id=1640>

²² <http://academy.itu.int/mod/resource/view.php?id=1737>

Internet Training Centres

- State Engineering College of Armenia, Armenia;
- Vitebsk College of Communication, Belarus;
- Georgian Technical University, Georgia;
- International University of Kyrgyzstan, Kyrgyzstan;
- Kyrgyz National University, Kyrgyzstan;
- Head Training Center of Ukrtelecom, Ukraine; and
- Samarkhand State University, Uzbekistan

5. CONCLUSIONS AND RECOMMENDATIONS

Policy-makers need to make sure that the *digital divide*, which remains a key concern for developing countries, does not also become a *knowledge divide* between those who have access to the information and learning tools of the 21st century and those who do not. It is best to consider ICT literacy as a continuum of skills and abilities and efforts need to be made at a number of policy and practical levels.

In reviewing some commonality of the various regional and international approaches discussed in Section 4 above, several possible policy directions emerge that could be considered by *Connect CIS Summit* participants:

- ICT literacy initiatives should be undertaken at all levels of society;
- Training in ICTs should be integrated into national educational curricula;
- ICT policy-makers and ICT industry should be closely involved in initiatives to improve existing educational curricula including professional and executive education in the sphere of ICTs;
- In cooperation with other regional initiatives and international standards, standardized ICT-related education curricula, qualification certification and accreditation mechanisms should be developed;
- The introduction and use of open and distance learning (ODL) in educational systems should be encouraged;
- Local content development for educational, scientific, cultural or recreational purposes should be encouraged;
- A rich public domain of educational and training materials in local languages should be encouraged, including making available high-quality open education resources (OER) that can be shared across relevant educational and training institutions;
- Policy-makers should consider the overall coherence of their national policies (for example, integrating digital connectivity and education initiatives) to support their broader goals of development and ICT literacy capacity-building.
