UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

TOWARDS A KNOWLEDGE-BASED ECONOMY

UZBEKISTAN

Country Readiness Assessment Report

UNITED NATIONS

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

TOWARDS A KNOWLEDGE-BASED ECONOMY

UZBEKISTAN

COUNTRY READINESS ASSESSMENT REPORT

Geneva and New York, 2003

FOREWORD

The last decades of the 20th century have represented a turning point in the global development process. It is knowledge that has become the engine of the social, economic and cultural development in today's world. Knowledge-intensive economic activities are now a factor of production of strategic importance in the leading countries. They have also become the main indicator of the level of development and the readiness of every country for further economic and cultural growth in the 21st century. Taking into consideration all these factors, the United Nations Economic Commission for Europe has launched an initiative of monitoring and analysing the development of the knowledge-based economy in all the European countries in transition.

The major goal of this initiative is to stimulate the exchange of national experiences, to identify best practices and to promote the region-wide and global-wide cooperation of the UNECE member States, which would accelerate the development of a knowledge-based economy in the countries in transition. It envisages the preparation of country assessment reports on a biennium basis by national experts, nominated by Governments, the creation of a High-Level Task Force on the Knowledge-Based Economy, which will consider the reports and provide policy advice and recommendations to the participating countries, and the development of progress measurements and indicators, policy guidelines and tools to assist countries in overcoming obstacles to the development of a knowledge-based economy.

We hope that the country assessment reports, showing a detailed level of the countries' potential and providing information on various approaches and solutions, will help policy-makers to take strategic decisions with regard to the challenges facing them in the development of institutions, information and innovation systems, human resources development and other areas crucial for the development of a knowledge-based economy.

Brigita Schmőgnerová

Executive Secretary
United Nations Economic Commission for Europe

PREFACE

The industrial revolution of the 19th century and the scientific revolution of the 20th century prepared the conditions for the rise of the knowledge-based economy. Economic activities associated with the production and utilization of information and knowledge have become an engine of economic growth in the developed market economies, increasingly transforming all the other dimensions of development and the entire societal *modus vivendi* and *modus operandi* of the humanity.

What do we mean by "the knowledge-based economy"?

It is not just the digital economy, which incorporates the production and use of computers and telecommunication equipment. It is not quite the networked economy, which incorporates the telecommunication and networking growth during the last decades and its impact on human progress.

The knowledge-based economy is a much more complex and broader phenomenon. There are different dimensions and aspects of the knowledge-based economy:

1. The knowledge-based economy has a very powerful technological driving force – a rapid growth of information and telecommunication technologies (ICT). Every three/four years a new generation of ICT appears. Today, the ICT companies are among the largest corporations. The ICT sector is among the fastest growing economic sectors.

2. Telecommunication and networking, stimulated by a rapid growth of ICTs, have penetrated all spheres of human activity, forcing them to work in an absolutely new mode and creating new spheres. The information society has become a reality.

3. Knowledge, based on information and supported by cultural and spiritual values, has become an independent force and the most decisive factor of social, economic, technological and cultural transformation.

4. The knowledge-based economy has allowed a rapid integration of the enormous intellectual resources of economies in transition into the European intellectual pool, stimulating the development of the former countries. Every country can benefit from developing a knowledge-based economy to become a more equal participant in the global development process.

5. The emerging knowledge-based economy has been affecting other areas of societal activity in every country, including institutional and innovation systems, human resources development, etc. and vice versa. The knowledge-based economy has become an engine of progress in every country. If a country is developed, it has a developed knowledge-based economy, if a country is lagging behind, a knowledge-based economy constitutes just a small fraction of its economy.

The report below was prepared by a national expert, nominated by the Government, and represents an overview of the present situation and an assessment of the emerging trends in all the major areas, constituting the foundation of the knowledge-based economy, such as policy and policy instruments, institutional regime, ICT infrastructure, information

system, national innovation capacities and capabilities.

The report was published by the Coordinating Unit for Operational Activities under the guidance of Ms. Larissa Kapitsa with assistance of Ms. Alison Mangin, Ms. Tatiana Apatenko and Mr. Mitja Jarh.

CONTENTS

INTRODUCTION

In the last decade of the 20th century, information and communication technologies (ICT) became one of the major factors influencing the development of society and the life of people. Many countries understand the enormous advantages brought about by the accelerated development and proliferation of information-communication technologies. The economic activities associated with the manufacturing and use of information technology have become a driving force of the steady economic growth of these countries. A new era of knowledge-based economy has begun.

Knowledge-based economy is not only the digital economy that comprises the manufacturing and use of computers and telecommunication equipment. It is not only the networked economy, whose elements are connected and operate through telecommunications.

There are various aspects of the knowledge-based economy:

- The knowledge-based economy is enabled and driven by powerful technology, ICT. A new ICT generation appears every three - four years. Today, ICT companies are in line with the largest corporations. The ICT sector is considered to be one of the most rapidly growing economic sectors;

- A telecommunication network, integrally connected with ICT growth, has spread its roots throughout all spheres of human activity, forcing them to change their methods of operation and the conditions under which they operate;

- Knowledge based on information and supported by cultural and spiritual values has become an independent force and decisive factor in a social, economic, technological and cultural transformation;

- A global information society has becoming a reality. The knowledge-based economy has allowed a fast integration of the huge intellectual resources of the transition countries into a global pool, stimulating the development of everyone;

- The knowledge-based economy continues to influence other spheres of public life of countries, including the institutional and innovation systems, development of human resources, etc.

This report is prepared by a national expert appointed by the Government of the Republic of Uzbekistan. It reviews the current status of the ICT sector and tendencies in the basic areas of the Uzbek knowledge-based economy, including policies and policy instruments, institutional mode, ICT infrastructure, information system, innovation opportunities and the perspective and challenges faced by Uzbekistan in the area of the ICT development.

1. NATIONAL STRATEGY AND ACTION PLAN

1.1. Strategy and Action Plan

The ICT sector has become a major component of the economy of Uzbekistan and a force of its growth. The basic aspects and strategic goals of the country with respect to ICT and the Internet are highlighted in the Statement by the President of Republic of Uzbekistan, May 2001.

As of May 2003, several National Programmes targeted to ICT and Internet network development in Uzbekistan have been developed:

«A National Programme of Reconstruction and Development of Telecommunication Network of the Republic of Uzbekistan for the Period up to 2010» (Resolution of the Cabinet of Ministers № 307, 1 August 1995).

The purpose of the Programme is to create a National Telecommunication Network on the basis of digital transmission systems and digital switching equipment, stipulating a deep integration into the global telecommunication system and providing comprehensive satisfaction of the needs of the economy and the population in communication services.

The main objectives of the Programme are:

- Defining priority directions of the telecommunication development;
- Formulating the State principles for support of the telecommunication development;
- Attracting investment resources from non-governmental sources, including foreign investment, for telecommunication network development;
- Creating a material and technological basis of communication that meets international requirements, organization of production of telecommunication equipment, optical-fiber cable with the participation of foreign investors;
- Observance of sovereign rights of the country and the interests of regional structures in forming the technical basis of telecommunication and organization of their interaction during the creation and operational stages of development of the telecommunication system.

«Programme of Modernization and Development of National Data Transmission Network of the Republic of Uzbekistan for the Period 1999-2003» (Resolution of the Cabinet of Ministers № 193, 22 April 1999.)

The purpose of the Programme is to define basic organizational and technical measures to stimulate modernization and development of the National Data Transmission Network for the period 1999-2003 and a network expansion in Tashkent, Nukus and province centres within the period 1999-2001 and in the Regional Centres during 2000-2003.

The primary objectives of the Programme are:
- Basic technical requirements for the construction and organization of the National Data Transmission Network;

- Technical means, ways of perfection of communication basis for the creation of a single information space and expansion of the opportunity for integration of the Republic of Uzbekistan into a global information space;
- Measures on centralized connection of data transmission networks of the Country operators (providers) to global information networks, including the Internet, and long-distance networks of the Republic of Uzbekistan, as well as identifying directions and stages of network modernization and development;
- Identifying sources and mechanisms of financing network modernization and development, including utilization of the National Operator-UzPAK finances, attraction of foreign investments, and the utilization of budgetary resources.

«Programme of Computerization and Information Technologies Development for 2002-2010» (Resolution of the Cabinet of Ministers № 200, 6 June 2002). The main purpose of the Programme is satisfaction of information needs of society and raising the competitiveness of domestic producers on global markets.

The following are foreseen as goals:
- Accelerating the development of modern telecommunication infrastructure and digitalization of networks and the development of mobile networks;
- Development of an Internet National Segment;
- Creation of conditions stimulating the development of computerization, domestic industry and exports of software;
- Training of highly qualified personnel in ICT;
- Development of a competitive environment in the ICT sector;
- Further perfection of the normative and legislation base, standardization and certification.

1.2.   International Cooperation

The State Programmes have the assistance of donor countries: United Kingdom, Germany, United States of America, Switzerland and Japan. These countries bring an essential contribution to the development of the Uzbekistan ICT sector by supporting scientific research institutes, educational establishments, small and medium-sized businesses, and non-governmental organizations.

The development of the Uzbekistan ICT sector also enjoys the support of the UNDP, World Bank, EBRD, ABD, European Union, USAID, Soros Foundation and other international donor organizations. In particular, the NATO Scientific Programme provides for ICT development in national academic establishments and the creation of Internet multiple access points in the national education and library system. UNDP special programmes/projects bolster the ICT development in governmental bodies. Some of these projects aim at promoting ICT development also in the private sector.

The sustainability of international donor assistance is very important for the successful realization of the National Strategy for ICT Development in Uzbekistan.

2.   INSTITUTIONAL MODE

2.1.   Government Bodies

The following government bodies were set up to formulate and oversee the implementation of the National Strategy and Action Plan:

Coordinating Council on Development of Computerization and Information-Communication Technologies (www.ICTCouncil.gov.uz)

The Coordinating Council, lead by a Deputy Prime-Minister of the Republic of Uzbekistan, is a supreme body on coordination of development of computerization and information-communication technologies.

The basic functions of this body are:

- Formulating an ICT Development Strategy;
- Overseeing the development of ICT Programmes;
- Defining a policy aiming at the creation of favourable climate for ICT development;
- Coordination of training and re-training of qualified personnel in the ICT Sector;
- Facilitation of the creation of a competitive environment and support of innovative businesses in the ICT Sector;
- Facilitation of the development of international cooperation in ICT and extension of access of educational establishments to information networks.

Communications and Information Agency of Uzbekistan (www.aci.uz)

The Communications and Information Agency of Uzbekistan is a special authorized body on state regulation in the communications and ICT Sector.

The main goals of this body are:

- Organization of performance of communication and ICT development programmes;
- Deepening economic reforms in the communication and informatization sector;
- Regulating telecommunication infrastructure development, creation of a competitive environment, licensing and maintenance of certification in communication and ICT;
- Development and introduction of modern standards and requirements for telecommunication and information technologies;
- Coordination of practical activities of Ministries and Agencies/Committees on creation and use of information databases, networks, electronic government;
- Expertise of created electronic information networks;
- Realization of measures on protection of consumers' rights and provision of information security in communications and ICT;
- Development of draft legislative acts and standards in ICT.

The Communication and Information Agency of Uzbekistan is a working body of the Coordinating Council on Development of Computerization and Information Communication Technologies.

Press and Information Agency of Uzbekistan (www.uzapi.gov.uz)

The Press and Information Agency of Uzbekistan is a specially authorized body on State regulation of development of mass media, publishing and printing.

The main goals of this body are:

- Monitoring of legislation in the area of mass media and maintenance of guarantees of freedom of speech and press;
- Realization of State policy in publishing and printing, mass media, distribution of periodicals, including realization of registration in the specified kinds of activity;
- Monitoring compliance with current legislative acts and regulation in the area of information;
- Maintenance of protection of the rights and interests of citizens and legal persons in the field of production, distributions and access to information.

Computerization and Information Technologies Development Centre – UzInfoCom (www.UzInfoCom.uz)

The Computerization and Information Technologies Development Centre is established in accordance with the Decree of the President of the Republic of Uzbekistan as a non-governmental organization.

The main goals of the Centre are:

- Development of draft programmes, normative acts in the sphere of information-communication technologies;
- Participation in tenders on development of applied and adapted software, information databases, websites and other software products for branches of real economy, management spheres, business, public health services, science and education, and also on realization of the programme of electronic commerce;
- Rendering a wide spectrum of information and consulting services for controlling bodies, budgetary organizations and private business on issues of computerization and introduction of information-communication technologies;
- Preparation of quarterly reports and reviews on global and domestic trends in the development of information-communication technologies, modern international standards in this sector.

Digital Development Initiative Programme – (www.ddi.uz)

The Digital Development Initiative Programme (DDI Programme) was initiated by the UNDP Permanent Representation in Uzbekistan. A strategic partner of the DDI Programme is the Government of the Republic of Uzbekistan in conjunction with the Communication and Information Agency of Uzbekistan.

The purpose of DDI Programme is utilization of advantages of the information revolution in Uzbekistan.

The main goals of the DDI Programme are the following:

- Stimulating the process of national dialogue on ICT development issues;
- Assistance to Internet development and promotion of application of ICT in various spheres of the economy and management of Uzbekistan;
- Provision of training in ICT for civil servants, public organizations and representatives from small and medium-sized businesses;
- Assistance for realization of distance-learning and other methods of e-education;
- Evaluation of the development state and needs of Uzbekistan for ensuring a successful transition towards to the knowledge-based economy and information society.

Moreover, *special structural divisions*, responsible for the creation and maintenance of information networks and databases and ICT development, *are established in each Ministry (Agency/Committee)*.

2.2.   The Legislation

The current legislation provides a normative framework for ICT development, defines an order of establishment of firms on the telecommunications and information technologies market, sets up general principles of activity on this market, firm taxation, and measures of responsibility for infringement of legislation. Today, more than 15 Laws, including the Constitution, Civil and Tax Codes, Administrative Responsibility Code, regulate the activity in this economic sector.

Special Laws defining Uzbekistan' State policy in ICT are listed below:

- Telecommunication Law;
- Communication Law;
- Radio-Frequency Spectrum Law;
- Mass Media Law;
- Informatization Law;
- Law on Guarantees and Freedom of Access to Information;
- IPR, including Copyright;
- Law on Licensing of Some Kinds of Activity;
- Law on Protection of Right of Computers Software and Databases.

The majority of legislative blocks consist of the Presidential Decrees and Government Resolutions and normative acts regulating various aspects of ICT development. In particular, special tax and custom privileges, stimulating computerization process of society and ICT utilization, were granted by the Presidential Decree of 30 May 2002 (№ UP-3080), Government Decisions of 22 August 2002 (№ 296), and 23 September 2002 (№ 328).

Taking into account the necessity of further perfection of the legislative base and the creation of a favourable environment for ICT development, the Government has prepared and submitted to the Parliament the following draft laws: «Informatization Law» (new edition) and «Electronic Digital Signature Law». Alongside these, the Cabinet of Ministers of the Republic has finalized the formulation of the draft «Electronic Document Circulation Law», «Electronic Commerce Law» and «Electronic Payments Law».

3. PRESENT SITUATION AND TENDENCIES IN INFORMATION SYSTEMS DEVELOPMENT

3.1. Information Infrastructure

Telecommunication network

General long-distance channels of the telecommunication network of the country are based on fiber-optic and microwave (radio relay) communication lines (TAE FOCL, FOCL and radio relay lines), and they allow creation of high-speed data transmission lines (from 64 Kbps up to 2048 Kbps) between Tashkent, Nukus and the regional centres of Uzbekistan.

Communication between the regional centres and areas essentially varies throughout the territory of Uzbekistan. A modern network is already established in the northern areas of the country: in Karakalpakstan Republic, Bukhara, Navoi, Khorezm and Syr-Darya provinces. Almost 40 per cent of these areas have digital channels. In other areas, the analogue channels connecting the regional centres with areas remain in place.

International telecommunication network

Construction of the Trans-Asian-Europe Fiber-Optical Communications Link (TAE FOCL) is complete, and a national segment of the fiber-optic communication backbone was launched in 1998. This line has connected China to Europe and allowed the creation of direct channels to China, Germany, Turkey, Russia, Kazakhstan, Turkmenistan, and also has given digital channels for connection of some regional centres of Uzbekistan. From a total bandwidth of 155 Mbps TAE east direction only 10 per cent are currently involved.

Trunk telecommunication network

At present, the trunk telecommunication network consists of fiber optic lines 1913.35 km in length, and radio-relay lines (RRL) 1028.83 km in length. The total extent of long-distance telephone channels is 7867,917 thousands channel-km, where 73 per cent are digital channels. The length of international telephone channels is 3025,75 thousands in channel-km, where 84 per cent are digital.

Local telecommunication network

At present, there are 2077 telephone exchanges (more than 9.67 per cent of them are digital) in the country, and total capacity makes up to 1.92 million numbers. Networks of Navoi Telecom (76 per cent), Bukhara Telecom (71 per cent), Khoresm Telecom (60 per cent) and Joint Venture Chirkom (66 per cent) have the biggest number of digital telephone exchanges.

The extent of FOCL in the city telecommunications networks is 1434,243 thousands channel-km that are used for communication between telephone exchanges. Communication between telephone exchanges allows data transmission with a speed of up to 155/622 Mbps.

Mobile communication networks

There are seven mobile operators on the mobile communication market, and three of them are using AMPS (DAMPS) and GSM standards, and are currently capable of covering the whole territory of the Republic. Another three of operators, using GSM and IS-95 (CDMA) standard, render services within and around of Tashkent, capital of Uzbekistan. The Operator JV «UzbekTelecom» has launched a project on creating a cellular network in regions of the Republic, using CDMA-450. Of the above-mentioned operators, only two cellular operators perform international roaming with operators from more than 40 countries of the world.

General indicators of telecommunication development in 2001 – 2002

Number of phones, thousands	1,630 – 1,638
Density, number of phones per 100 person	6.65 – 6,68
Number of mobile phones, thousands	127 – 187
Density, number of mobile phones per 100 person	0.5 – 0.8

Satellite communication

About forty artificial satellites are accessible in Uzbekistan, and about fifteen of them cover the country. The majority of these satellites belong to INTELSAT, INMARSAT, CCC ASIASAT, TURKSAT, Russian Federation, etc.

It is expected that within the coming years the number of artificial satellites will be substantially increased, which will create a favourable opportunity for development of satellite communication networks (SCN) in Uzbekistan on the basis of satellite capacity.

3.2. Data Transmission and Internet

Data transmission networks in Uzbekistan are constructed on the currently existing telecommunication network. Leased circuits (mainly digital) are being used to organize data transmission long-distance and at central-office level. International connection (output) of networks with international information networks, including the Internet, is organized by direct communication, using satellite and terrestrial digital international channels.

As of 1 January 2003, the number of subjects, rendering data transmission services, including the Internet, is 135. Of these, 64 render services through multiple access points (Internet-cafe, Internet-clubs, etc.).

Data on large providers are given in the table below:

Operator	International capacity	Partners
UzPAK	*7.5 Mbps*	*Sea Bone (Italia)* *TAE / China Telecom* *Satis (Germany)* *DeteSat (Russia)*
Naytov	*3.5 Mbps*	*Teleross (Russia)*
Uzscinet (UNDP)	*3.5 Mbps*	*KPN (Holland)*
Sarkor Telecom	*4 Mbps*	*TAE / China Telecom;Cable & Wireless*

Intal Telekom	*2.5 Mbps*	*TAE / China Telecom*
Sharq Taraqqiyoti	*2 Mbps*	*Yamal / Sonera (Russia)*
TPS	*1 Mbps*	*TAE / China Telecom*
TOTAL: 24 Mbps (including other channels)		

UzPAK and Naytov ISPs provide Internet access on practically the whole territory of Uzbekistan. The majority of Internet providers operate mainly in Tashkent. Local Internet providers supply a full set of Internet services, including: dial-up connection, leased lines, e-mail and domain names (DNS) services, hosting, and web-design. Voice-over-IP (VoIP) services are officially not accessible on the territory of Uzbekistan although some companies and organizations are engaged in the development of this technology. Some companies use corporate IP-telephony.

The general capacity of modem pools in the country is estimated at 3,500 units (ports). The real average speed of access is about 19.2 kbps on analogue lines. An average speed up to 44.0–64.0 kbps is possible on digital lines. More and more regions of the country are receiving new digital equipment and fiber optic channels. There has therefore been a gradual improvement of quality and connection speed to Internet.

Only four Internet providers provide round-the-clock service for end users (help-desk).

3.3.   Internet Availability

Cost of services

Despite the existing Internet-services competitive market, prices for Internet access are high, relative to the average per capita income. Many providers carry out an aggressive policy to attract clients by granting various package deals, discounts, and privileges for local users. Discount connection to Internet at night is thus becoming more and more popular: if the average dial-up connection rate in Uzbekistan is 700-1600 Uzbek Suoms per 1 hour in day time, at night this is 450-700 Uzbek Suoms.

The cost of Internet-connection with a speed of 19.2 Kbps varies from US$ 400 up to US$ 600 per month, depending on marketing and traffic; with speed 1024 Kbps - from US$ 500 up to US$ 2000 per month. Understandably, only large corporate clients, banks or foreign representations can get connected by a leased line. The majority of ISPs clients make the connection by dial-up (the average ratio of those who make dial-up connection, and those connected through leased lines, is approximately 1:100).

Computer, telecommunication and related equipment

Manufacturing of computers in the country is barely established, although attempts to assemble computers have been undertaken. However, these attempts were not sustained due to the problems of converting local currency. The local ICT equipment market is still dominated by imported equipment.

According to experts' estimates, the price of a PC, depending on configuration and brand, is from US$ 500 up to US$ 2,500.

The annual growth of the number PCs is increasing by approximately 25,000–30,000 items.

Purchasing capacity

For the majority of the population Internet access is limited, because of the low purchasing capacity, shown in the table below. Average monthly salary in 2002, by the World Bank experts' estimation, was about 26,000-28,000 Soums.

Average monthly nominal wages in selected sectors of economy, in Uzbek Soums

Year	Industry	Agricul-ture	Tran-sport	Con-struction	Trade	Computer services	Health care	Educa-tion	Banking
1996	3054.0	3054.0	1187.0	3638.0	1118.0	397.0	1395.0	1537.0	4036.0
1997	5352.0	5352.0	1910.0	5979.0	2415.0	6416.0	2260.0	2468.0	7950.0
1998	8428.0	8428.0	2503.9	8259.6	4265.4	10820.4	3283.9	3698.0	11428.2
1999	14068.0	14068.0	4105.9	12847.7	6475.9	19595.4	5499.6	6162.5	16213.4
2000	19184.0	5163.3	16153.0	16218.9	7936.1	30116.0	7143.6	8139.6	20060.6
2001 Quarter 1	28544.9	4728.1	25484.6	23174.2	12031.9	41428.4	10695.5	11675.8	36005.7

*Source: Bulletin of Uzbek Economic Trends, published in May 2001, by **Tacis**.*

In an attempt to widen access of the population to information technologies, in 1999 the project "Creation of Potential for Development of Internet Technologies and their Distribution in Uzbekistan" was launched by UNDP and the Open Society Institute in cooperation with the NATO Scientific Programme. The project is oriented to Internet development in the country with a main emphasis on basic network development of free access to the Internet for scientific and educational institutions of the Republic of Uzbekistan.

3.4. Internet Users

According to expert estimates, the total number of Internet users in Uzbekistan in 2002 reached almost 275,000 persons. As of 1 May 2003, their number was 310,000, more than twice the indicator of 2001 (137,000). About 73 per cent of the number of users are concentrated in Tashkent.

The basic share of users (almost 70 per cent) falls to multiple access points, whose total number today exceeds 100. The smallest number of multiple access points is in the Autonomous Republic of Karakalpakstan and the Surkhandarya province (just per one).

The number of Government bodies connected to the Internet, as of 1 January 2003, reached 286, and of their managing subjects – 5,123.

3.5. Internet Resources

The number of registered domains in the **.uz** zone at the beginning of 2003 reached 650. Web sites in Russian prevail among the resources of the **.uz** zone. About 70 per cent of local sites "broadcast" in this language. The number of sites in English and Uzbek is about the same. The Government is represented in the Internet by the official site www.gov.uz. At the same time, practically all Ministries, State Committees and Agencies have websites. Nine of 14 Governmental Bodies and State Management Organs have their Internet resources. Also, there are many sites of various companies – from providers to company offices – who have decided to open a homepage on the Internet.

The most popular local resources are the following information websites:

- www.ferghana.ru - information and news site, one of the oldest and most authoritative information projects of UzNET, and has won several local Internet competitions.
- www.uzreport.com - information and news site.
- www.uza.uz - information site
- http://onlife.mnet.uz - network youth magazine
- www.uzland.uz - information directory of Uzbekistan
- www.UzDessert.uz - site about Uzbek culture and music
- www.show.uz - information and entertainment portal
- www.forum.uz - on-line forum of Uzbekistan
- www.choyhona.uz - Uzbek IRC Chat

Mail services are available on both providers' and large free-of-charge sites. Leaders in the provision of this service are www.mail.arbuz.com, www.assalom.uz, www.mail.uzpak.uz.

There are several search engines like www.re.uz, www.vse.uz within the .uz zone. In April 2003, the popular world search engine Google (www.google.com) opened a site in the Uzbek language - www.google.uz

Free-of-charge hosting in Uzbekistan is represented by a small number. The most important providers are www.ferghana.ru, www.vip.uz and www.re.uz. Hosting of ISP www.assalom.com is considered to be the best among the paid hosting services. Similar services are also provided by www.billur.net.

From other network services providers banner-exchange networks www.reklama.uz, www.banner.uz and Internet-statistics services www.top.arbuz.com and www.axiom.uz should be noted.

3.6. Electronic Commerce

The number of companies in Uzbekistan which successfully use ICT in their activity is extremely low. At the same time, some positive experience in electronic commerce has already been gained in Uzbekistan. The introduction of e-commerce initiated by the Government of Uzbekistan (Resolution of the Cabinet of Ministers of 1 May 2001, № 198), such as a uniform electronic system of exchange tenders at the Uzbek Republican Commodity-Raw Stock Exchange (UzRCRSE), has led to appreciable growth of trade as a whole (increase of 1.45 times from the level of a similar period of 2001). However, the increase of volume of wholesale trade for the same period as a whole was only 1 per cent. For the first time in the history of the exchange movement of the Republic, the growth of turnover of exchange tenders in the regions of Uzbekistan outstripped the growth of turnover of exchange tenders in the capital of country (1.7 times against 1.3 times).

The experience of UzRCRSE shows that the greatest benefits from the introduction of electronic commerce were gained by businesses in the regions of the Republic, whose access to material resources without the introduction of ICT in business practice would otherwise have remained problematic.

As a whole, electronic commerce in Uzbekistan is in its initial stage of development. Several existing Internet-shops and trade platforms function on UzNET. An overwhelming majority of the companies use the network for publishing their price-lists only.

The Government of Uzbekistan pays significant attention to the development of electronic commerce. A Draft Programme of Development of Electronic Commerce, whose basic purpose is to develop an information infrastructure of the commodity market and services, establish and further perfect conditions for the development of electronic commerce, is formulated on the assumption of increasing efficiency of state support measures, integration and coordination of efforts of public and private (commercial) organizations. At the same time, the Government is preparing a new legislative initiative on perfection of the legislation on electronic commerce.

3.7. Electronic Government

The majority of State and Government Bodies have established their own websites. These sites contain information on the functions and responsibilities of the State Body, its structure, field of activity, status and prospects of development of the sector, data and references on operational conditions for foreign investors, and news. A functioning Governmental Network – UzNET, provides access of various ministries and departments of the Country to the Internet and e-mail services. A number of State organizations, including the Central Bank, Ministry of Internal Affairs, Ministry of Defence and the State Tax Committee, have their own corporate network. The corporate network of the Central Bank, connecting 920 branches of banks across all Uzbekistan, is the biggest data transmission network in the country.

The Government is interested in easing the access of the population to the Government by providing public services online. It is also aiming to achieve a high degree of "electronization" of the economy. For this purpose, the Government of Uzbekistan has prepared a Draft Programme for the Introduction of Electronic Technologies into Government for the period 2003-2010.

4.   HUMAN RESOURCES

Education

According to the UNDP Report «Central Asia 2010, Prospects of Human Development», the level of literacy of the adult population of Uzbekistan is 97.2 per cent, which is very close to the corresponding average indicator of the developed market economies (98.6 per cent).

4.1. Professional Education

Modern ICT for schools is practically unreachable. About 50 per cent of 9,688 schools are equipped with computer classes. A small number of the schools have a computer class equipped with PCs of the Pentium generation, 7 per cent have 386/486 models and 42 per cent have out-of-date personal computers (joint Soviet and Bulgarian production).

Schools, on the average, have one modern computer (Pentium II or latest) per 1000 pupils of 8-9 grade. About 2 per cent of the schools have computer classes with network opportunities and only 0.2 per cent of the schools have an Internet access.

Some libraries have started to use software, developed in the country and the Russian Federation for automation of routine operations, but do not provide online access to their resources.

№	Regional department of national education	Number of schools	Number of computer classes	% of the PC equipped schools	Annual increase in total number of computer classes				
					1998	1999	2000	2001	2002
1	Karakalpakstan	763	73	9.56	6	2	6	13	14
2	Andijan	742	92	12.4	4	1	5	3	14
3	Bukhara	530	82	15.4	5	2	6	6	10
4	Djizzakh	530	68	12.83	3	2	7	5	8
5	Kashkadarya	1082	75	6.93	7	3	8	16	17
6	Navoi	377	69	18.3	4	2	7	5	9
7	Namangan	670	126	18.8	8	3	8	6	14
8	Samarkand	1194	104	8.71	7	3	8	26	23
9	Syrdarya	307	46	14.98	4	2	9	3	2
10	Surkhandarya	812	88	10.83	6	3	4	11	10
11	Tashkent	894	74	8.27	4	1	3	15	15
12	Fergana	902	119	13.2	7	3	3	9	15
13	Khoresm	533	64	12.07	6	2	6	4	10
14	Tashkent city	332	69	20.8	7	3	3	6	5
	Total	9688	1104	11.4	78	32	83	128	166

Technical educational institutions

At present, there are some mid-level-special educational institutions that are preparing middle-level specialists in ICT. However, they do have a formal status of specialized educational institution in ICT. Of a total of 306 specialized colleges, grammar schools and schools, only 22 have access to the Internet. Objective limitations such as: shortage of technical equipment, software and financial maintenance, low level of curriculum content and professional level of teachers, constrain the preparation of qualified middle-level IT-specialists. Good quality training of middle-layer ICT specialists is mainly available at Universities and Private Educational Centres.

Short-term courses

Short-term comprehensive courses for preparation of ICT specialists are organized at educational centres. These local centres offer accessible courses, intended for the general public.

Specific advanced courses on ICT exist at the certificated educational centres of Microsoft and Cisco Networking Academia. These courses are designed for professionals and, consequently, they are more expensive. Most of these centres are located in Tashkent.

4.2. Higher Education

Higher Educational Institutions (HEI) of the country prepare qualified experts, including ICT specialists, with bachelor (4 years) and master degrees (+2 years). Specialized ICT courses make up approximately 16 per cent of total number of subject courses in the curricula of HEI. Graduates should independently learn practical skills. The provision of

13

computers by the universities is 3.3 per 100 students, on the average, and varies throughout the universities from 2.1 up to 17.7.

HEI of the country have a limited Internet access. According to the Ministry for High and Middle Special Education, only 63 HEI of the country have Internet access.

The University of Information Technologies and International Westminster University also train specialists on ICT. The Institute for Computer and Information Technologies (ICIT), which has been created at one of the largest universities of Uzbekistan – Tashkent Technical University (TTU) – is a pilot project carried out within the framework of measures planned by the Government Programme for Computerization and Information Technologies Development for 2002-2010.

The total of number graduates in information-communication technologies in 2002 was 1638. For further expansion of the pool of qualified personnel in ICT, a Draft of Special Programme for Training and Retraining of Specialists and Teachers in ICT, which will become a component of the National Personnel Training Programme of the Republic of Uzbekistan, has been developed. This Special Programme sets a task to supply ICT high schools with up to 50 computers per 100 students by the expiry date of the Programme by 2010.

It should be noted that the ICT speciality is not yet popular among high school students. According to the polling results of the Centre on Public Opinion Studies, the most popular profession among the youth of Uzbekistan is economist, followed by medical and foreign language professions. The future skills supply, as is seen from the table below, is not very favourable for the development of the ICT domestic sector.

Average number of students applying for each space available in a faculty in the Republic

	Field of study	Average number of students
1	Law Science, Teaching Law	24,00
2	Biology	20,30
3	History	19,80
4	Philosophy, basis of spiritual and national ideology	17,90
5	Uzbek philology; Uzbek language and literature	16,90
6	Pedagogy and technique of elementary education	16,90
7	Pedagogy and psychology	15,40
8	Telecommunication; Informatization	13,80
9	Finances	11,80
10	Stomatology	11,00
11	General Medical Practitioner	11,00
12	Economics	10,70
13	Health protection	10,70
14	Agricultural science	10,00
15	International tourism; service	9,80

5. NATIONAL INNOVATION OPPORTUNITIES

5.1. Innovation

The development of a knowledge-based economy has been driven by innovation and the application of new technologies. The development therefore of a system that supports and encourages innovative activities is crucial for closing the gap between Uzbekistan and the advanced market economies in the area of R&D and, hence, of knowledge-intensive activities.

In 2002, 112 innovative projects were completed in Uzbekistan. The budgetary allocation for R&D was 573 million Uzbek Suoms (about US$ 600,000). In order to mobilize additional resources for financing innovative activities and the commercialization of their products, the Uzbek Government has introduced a principle of participatory financing. The principle of participatory financing has become one of the most effective elements of the commercialization mechanism of such projects. It consists of a flexible combination of budgetary appropriations and finances of branches, regions, enterprises and organizations interested in solving the problems put before scientists. So, the volume of the off-budgetary finance mobilized for financing the above projects were 198 million Uzbek Suoms (about US$ 200,000).

Since 2000, a steady growth of patents has been registered. If, in 2001, 651 patents were granted, where 485 patents were given for inventions, in 2002 the total number of patents amounted to 658, of which 515 patents were granted for inventions. The total number of copyright certificates, enforcing copyrights for computer programmes and databases, remain practically without change, 117-122 certificates a year.

5.2. Research and Development

In order to further develop the scientific and technological potential of Uzbekistan, sustaining the development of the country and ensuring the efficiency of scientific research work and technological development, the Coordination Council on Scientific and Technical Development was established at the Cabinet of Ministers of the Republic Uzbekistan by the Decree of President of the Republic of Uzbekistan on 20 February 2002.

The primary goals of this body are:

- Defining priority directions for fundamental and applied scientific research work and technological development in coordination with the strategy of development of branches of the economic and social sphere;
- Organization of expertise and feasibility studies for large research programmes and technological projects;
- Annual preparation of the State Programme of Scientific Research Work and Technological Development;
- Creation of a support system for talented scientists.

The Centre for Science and Technologies is an executive body of the Coordination Council on Scientific and Technical Development.

5.3. Science

The system of the Academy of Science of Uzbekistan consists of 187 Scientific–Research Institutes. In the sphere of the Academy of Science, about 6000 researchers and scientists are employed, of whom more than 2000 are directly involved in research.

The main purpose of the Academy of Science of Uzbekistan is to promote the development of fundamental research in the field of economy, industrial and information development, and also studies on new opportunities for practical use of scientific achievements.

6.   MAJOR NATIONAL INITIATIVES

The main national initiatives of the Republic of Uzbekistan are elaborated in view of global tendencies, the existing level of ICT development in Uzbekistan and the importance of ICT for the country.

The political desire of the Government to pursue ICT development is expressed in the Programme for ICT Sector Development (Resolution of the Cabinet of Ministers of 6 June 2002 № 200) and in the Programme for Telecommunication Development, introduction of electronic technologies in government management and development of electronic commerce for the period 2003-2010, but also in the aspiration to create a competitive environment for ICT development in the country (Resolutions of the Cabinet of Ministers dated 10 October 2002 № 352, and 17 December 2001 № 488).

ICT development is a process requiring large investments, which is rather difficult at the moment. In this connection, an accelerated ICT development is carried out mainly at the expense of the private sector returns, received by private firms from ICT. The Government generally promotes ICT development through the creation of favourable investment, tax and customs modes, and stimulating public demand for ICT.

The implementation of the above-mentioned goals will require:

- Perfection of the normative-legal base in the field of ICT development and use.
- Perfection of the system of economic stimuli and other forms of state support for ICT development.
- Development of practical measures to implement the target programmes presented below:
    - Introduction of electronic technologies in the Government for the period 2003-2010;
    - Development of electronic commerce for the period 2003-2010;
    - Development of telecommunications for the period up to 2010;
    - Training and retraining of specialists and teachers in ICT.
- Development and realization of specific programmes (health care, taxation, provision of pensions, social insurance, etc.) for the ICT sector.

Conclusion

Uzbekistan is entering a period of fast ICT modernization with a number of positive values, assisting the development of a new strategic focus on ICT and information services.

Among the factors favouring this strategic course, are:

- Strong political desire of the Government to pursue ICT development;
- High level of existing human resources;
- Availability of the fiber-optic telecommunication network, connecting most cities and regions of the country;
- Sufficient capacity of international telecommunication networks;
- Plenty of higher educational institutions across Uzbekistan;
- Relative development of the banking system with plastic cards payment and inter-banking network of payments;
- Presence of the "UzNET" network for governmental organizations;
- Growth of public interest in ICT.

At the same time, it is necessary to note that Uzbekistan has only recently begun the application of modern ICT. It yet has not many components of an information society.

The weak points of the domestic ICT sector are:

- High tariff rates on Internet services;
- Insufficient development of domestic data transmission network;
- Insufficient quantity of computers per students;
- Insufficient attention of local State management bodies to ICT development;
- Limited local resources offering online training;
- Low purchasing capacity of the population and high costs of modern equipment;
- Significant "digital gap" between Tashkent city and other regions of Uzbekistan;
- Backwardness of the Internet-payment system, telemedicine and software;
- Deficiencies of the existing legislation, constraining the development of a local ICT industry;
- Absence of competition on the local market of basic network services.

Annex I

**Benchmarking of the Knowledge-based
Economy Development of Uzbekistan**

TABLE	CATEGORY	STAGE
1	Information infrastructure	2
	Internet availability	2
	Internet affordability	2
2	Network speed and quality	3
	Hardware and software	3
	Service and support	2
3	Schools' access to ICT	2,5
	Enhancing education with ICT	2
	Developing the ICT work force	3
4	People and organizations online	2
	Locally relevant content	3
	ICT in everyday life	2
	ICT in the workplace	3
5	ICT employment opportunities	3
	B2C electronic commerce	2
	B2B electronic commerce	1
	E-Government	1
6	Telecommunications regulation	3
	ICT trade policy	2

Annex II:

Knowledge-Based Economy Indicators

1. Network Access

1.1. Information infrastructure

- Telephone penetration (number of mainlines per 100 people)

  6.73 per 100 people

- Mobile wireless penetration (%), growth trend

  0.8 per 100 people, growth trend is about 160% per annum

- Total number of mobile telephone subscribers

  1 January.2003 – 18,6750; 1 April 2003 – 203,581; 1 May 2003 – 211,782

- Total number of mobile telephone subscribers per 1000 people

  8.01 per 1000 people

- Wireless penetration (percentage of the population)

  0.8% of total population

- Growth trend

  Mobile telephone subscribes growth trend is about 160%

- Total number of cable TV subscribers

  19,418

- Cable TV subscribers, % of households

  0.5% of households

1.2. Internet availability

- Total number of ISP providers

  135

- Prevailing types of ISPs' networks (microwaves/radio…)

  Dial-up

- % of unsuccessful local calls

  N/a

- Is there competition among ISP providers?

  Yes, limited by Uzbek Telecom monopoly

- What are the opportunities for public Internet access (libraries, Internet-cafes, etc.)?

  106 Internet cafes and 64 public access points

- Are there dedicated line lease possibilities? Are there competing providers?

  Dedicated line services are available. Competing providers are not present due to existing monopoly of Uzbek Telecom.

1.3. Internet affordability

- What are the prices of Internet access (unlimited access, per minute charge)?

  The cost for dial-up connection during the daytime is about 700-1600 Soums per hour and 450-700 Soums per hour in the night

- Is it affordable for majority/minority (compare with average salary/income)?

  No, as the average salary in 2002, according to the World Bank expert estimations, is about 26-28 thousands Soums.

- What are the rates for leasing lines?

  US$ 250 or higher

- Are the rates affordable for small businesses or individuals?

  No

1.4. Network speed and quality

- What is the percentage of successful calls?

  42.4%

- What is the quality of voice connection?

  Satisfactory, mostly on digital exchanges

- How many faults are reported per year for each 100 telephone mainlines?

103

- How long does it take to clear faults (48 hours, a week, month)?

  Up to 80 hours

- Which services are supported by local telecommunications infrastructure: e-mail, high-speed modem connection, what is the maximum speed?

  ISDN services, lease of high speed lines, videoconferences, Internet, e-mail

- Are there sufficient backbone facilities/networks? Even for peak demand?

  Yes

- What is the percentage of packet loss by the network?

  Receiving packet loss probability on average to quarter – $2x10^{-5}$, network failure mean time, in hours, on average to quarter – 800

1.5. Hardware and software

- Are there local IT hardware/software sales points?

  Yes

- Is the price of IT hardware/software affordable for the majority/minority of citizens/businesses?

  Affordable to a significant part of businesses, but only a minority of the population

- Is there software in local languages?

  Yes, in small numbers

- Is software imported or adapted locally? (percentage of the imported, adapted, produced locally hardware or software in total number in circulation)

  More than 90% of the software is imported and adapted, 10% is produced locally

- Is there a broad variety/some/very few software business applications?

  Yes, some

- Are the IT software/hardware retail and wholesale markets competitive and vibrant?

  Yes

1.6. Service and support

- How long is the waiting period for telephone line instalment? (total number of those on the waiting list; waiting period: days, weeks, months, years)

  10 days in the presence of technical feasibility, 6 month in putting into operation of new exchange

- How long is the waiting period for a reported telephone line problem to be fixed? (minutes, hours, days and etc.)

  Up to 80 hours
- Are there software developers, web designers, network administrators and other technical personnel, and how many (working where, employed/unemployed)?

  Yes, but numbers are not available

2. Networked Learning

2.1. Schools' access to ICTs

- Are there computers in schools? How many students per computer? At which level (university/secondary/primary)?

	Schools	**Lyceums and Colleges**
Number of schools	9688	857
Number of computers in schools	57114	11850
Number of schools with computer labs	938	N/a
Number of computers per school	6	14
Number of students	6329059	579818
Students per computer	110	49
% of schools with computer labs	9.7%	N/a

- Who has access to computers (technical staff/faculty/students)?

  Students, teachers, technical staff

- What is the quality of hardware (386/486/Pentium…)?

  Mostly 386

- Are there LANs in schools? Regional WANs? National school networks?

  There are LANs in some schools, no regional WANs are available

- Do schools have Internet connectivity? Is it dial up or through a leased line, wireless?

  Some schools have Internet connection, mainly through dial-up access

2.2. Enhancing education with ICTs

- What is the percentage of students and teachers who use computers? (in universities/primary schools/secondary schools)

  Universities – approximately 90%, lyceums and colleges – 80%, schools – more than 50%

- What are the computers used for? What is the level of computer literacy/skills?

  Mainly courses in Informatics

- What is the level of information and communication technologies integration in the curriculum?

  Entry level

2.3. Developing the ICT workforce

- Are there training opportunities for programming, maintenance, and support?

  Yes

- Who is offering them (public/private centres)?

  Public and private centres

- Are they affordable for majority/minority of the population?

  Yes, for the minority
- Is there on-line training available?

  Yes, very little

- Do employers offer training?

  Yes

3. Networked Society

3.1. People and organization online

- What is the percentage of the population which:

  - Is aware of the existence of Internet?
    43%
  - Has used Internet recently?
    4.6%
  - Uses Internet regularly?
    0.9%

- What is the structure of users by gender, age, social and educational status?

  N/A

- What is the number of locally registered domain names (per 1000 people)?

  0.1 per 1000 people

- Is there advertising for online companies, and how common is it?

  There is advertising for online companies in the press, electronic media, but it is rare

3.2. Locally relevant content

- Are there websites (and how many: no, few, some, many)?

    - Providing local topics?
      Many
    - In local languages?
      Very few, almost all websites are in Russian

- How often are they updated and is content static or dynamic?

  Few websites are updated frequently and few contain dynamic content

- Are the above websites created in the community?

  Yes

- Are bulletin board systems, Usenet groups, newsletters, and/or listservs in use?

  Yes

- Are there opportunities for Web-related training?

  Yes

3.3. ICTs in everyday life

- Does the population include information and communication technologies (phones, faxes, pagers, computers) in everyday life?

  Yes, computer use is popular

- Are there phones, wireless phones, digital assistants, pagers, PCs and are they being used regularly? Are they used for household commerce (banking, online shopping, investing) and social and commercial interaction (bartering, online chat and etc.)

Yes, used widely for communication, not for household commerce

- Are there PCs with e-mail capability available (cyber cafés, telecentres) and are they being widely used?

Yes, used widely

3.4. ICTs in the workplace

- Do employees have:

    - (Un)limited access to phones?
      Mostly limited access
    - Personal e-mail accounts?
      Not very often
    - Internet access from personal workstations?
      Not very often
    - E-mail and web addresses on business cards?
      Not very often

- What percentage of businesses and government offices have computers, how many of them, how many employees use them?

    90% of government and 30% of businesses have computers. Information on employees' use is not available

- Are they networked?

    Yes

- Is business mostly conducted in person or by e-mail, or are there data sharing, enterprise, reporting, transaction, and research applications? How intensively are they used?

    N/A

- Are there efficiency gains resulting from the use of ICT systems?

    N/A

4. Networked Economy

4.1. ICT employment opportunities

- Are there opportunities for technically skilled workers within the country?

    Yes, ICT employment is attractive

- Are companies from outside of the country investing in IT related projects?

Yes

- What is the proportion of knowledge workers and information related business in the economy? (Percentage of labour force, percentage of GDP)?

N/A

- Are businesses considering IT in their strategies?

N/A

4.2. B2C electronic commerce

- Do local businesses have websites and how many? Is content current or static?

  A small number of local businesses have websites, content is mostly static

- Are there online B2C transactions, or are transactions mainly oral and/or paper-based, phone or fax-based?

  Rarely with courier delivery and collection of payment on the delivery time

- Is online retail a noticeable component of the overall commercial activity?

  No

4.3. B2B electronic commerce

- What are the sources of market information, are they sufficient to provide transparency?

  Print and electronic media, TV, but very limited

- Are there online B2B transactions, or are transactions mainly oral, paper-based, phone or fax-based?

  No

- Can transactions be conducted online without any paper documents? Is the process automated? Does it allow online tracking, monitoring?

  No

- What portion of B2B activity is conducted on line? Is there gain in efficiency?

  N/A

4.4. E-Government

- Number of government resources online? Does this include information, hours of operation, any services? Is information current and relevant?

  42 government websites exist, that is 84% of all the government offices, but information is mostly not current

- Is there online interaction between government and citizens, or is interaction mainly oral, paper-based, phone or fax-based?

  Under development

- Is there online interaction between government and suppliers and contractors, or is the interaction mainly oral, paper-based, phone or fax-based?

  Under development

- Is it possible to download applications from the websites?

  Yes

- Can citizens apply for permits, licenses, and taxes on line?

  No

5. Network Policy

5.1. Telecommunications regulation

- Is liberalization of the telecommunications sector planned or implemented?

  Planned

- Is there competition between telecommunications service providers?

  Yes, but limited

- Is broadband Internet access offered?

  No

- Are regulations set and enforced by an independent body?

  Yes

5.2. ICT trade policy

- Do tariffs or other restrictions (technical standards, domestic regulation, etc.) exist?

Yes

- Are there restrictions in the service (including information services) sector?

  N/A

- Are there disproportional taxes on electronically delivered services?

  No

- Does Foreign Direct Investment in the IT sector exist, and is it encouraged, discouraged, restricted?

  Yes and encouraged

6. Media

6.1. Radio, TV and newspapers

- Number of Radio and TV stations, newspapers

  There are 62 TV/Radio stations (including Cable TV), 27 of them are TV Stations and 17 are Radio Stations

- The size of audience/circulation

  The two National channels (TV- 1and and ESHLAR) cover 98% of the whole territory of the country

6.2. Employment in the media

- Number of employees in the media

  N/A

- Trend: is the number increasing/decreasing?

  N/A

7. Intellectual Capital

7.1. Patents

- How many are issued per annum?

  658 in 2002 (515 for inventions, 9 for industrial designs, 23 for utility models, 11 for select achievements)

- What are the trends?

Growing trends. In 2001 there were 651 patents (485 for inventions, 152 for industrial designs, 10 for utility models, 4 for select achievements)

7.2. Copyrights

- How many are issued per annum?

  117 in 2002

- What are the trends?

  122 in 2001

7.3. Licenses

- How many are issued per annum?

  N/A

- What are the trends?

  N/A

7.4. Trademarks

- How many are issued per annum?

  849 in 2002 (trademarks were registered by national procedure of registration); There are 271,000 trademarks registered through the Madrid Agreement procedure

- What are the trends?

  676 in 2001(trademarks were registered by national procedure of registration)

7.5. Scientific and/or tech associations

- List with a brief profile

  N/A

8. Education

8.1. Higher education

- Total number of higher education establishments (public/private).

  63

- Total number of students (total average per annum, in the private and in the public sector)

  There are 232,254 students

- Prevailing specializations. (distribution of students among the fields)

  8,178 students on ICT speciality

Academic year 2001/2002

Study field	% of all students
Engineering and technology	27.63
Pedagogy	26.34
Humanitarian sciences	18.13
Economy	12.09
Health care	5.86
ICT	3.52
Agriculture	3.37
Jurisprudence	2.02
Others	1.04

- Cumulative number of population with higher education degrees (total and in science and technology fields)

  N/A

8.2. Distant learning

- Distant learning facilities

  20 distance learning websites, electronic books and manuals – 712

- Number of students trained per center

  N/A

9. Labour Force

9.1. Employment in science and technical fields

- Number of employees and trends in the fields

  36,528 employees

- Compensation rates in the fields (average salaries)

  N/A

9.2. Employment in electronics industry

- Number of employees and trends in the fields

  N/A

- Compensation rates and trends in the fields

  N/A

9.3. Employment in telecom industry

- Number of employees and trends in the fields

  More than 22,000

- Compensation rates and trends in the fields

  More than 55,000 Soums

10. Research and Development

10.1. Research institutions

- Number of research institutions

  187

10.2. Investments in research and development

- The total amount

  771 million Soums in 2002, of which 573 million Soums from the State budget

- Government and private business breakdown of total investment in research and development

  N/A