Azerbaijan

Local Expert: Yashar Hajiyev

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1 OVERVIEW

The current independent state of Azerbaijan was established in 1991. It has a population of 8.5 million with a landmass of 86,600 square kilometres. The GNI per capita was 785 Euro in 2005, according to World Bank figures. The government is a presidential republic, with 65 provinces (*rayons)* 69 cities and one autonomous republic (Nakhichevan, which is divided into 7 provinces and one city).

Rapid economic growth (35-40% in 2006) in Azerbaijan is leading to more rapid take-up of new ICT services. Despite a relatively developed communications infrastructure in Azerbaijan, prices remain high, which is hindering development of the sector.

The slowness of reforms in the legal, regulatory and institutional spheres of the telecoms sector also limits its potential. Recently, an agreement was signed between the Azerbaijani Ministry of Communications and Information Technologies and the US Department of State on the creation of an independent regulatory body, which should help reform the existing regulatory system and ensure effective implementation of legislation, creating a more coherent framework for liberalisation.

1.1 Regulation of Electronic Communications

There is no independent National Regulatory Authority in Azerbaijan, although one is planned in the short to medium term. The basic regulatory functions are carried out by the Ministry of Communications and Information Technology (MCIT).

A new Law on Telecommunications was adopted in 2005, although this requires secondary legislation in order to be implemented properly.

Licensed operators are required to negotiate interconnection, with the courts able to impose settlements on the basis of the 1997 Communications Law, the 2005 Telecommunication Law, and other normative acts of MCIT.

There is neither local loop unbundling nor is there any immediate possibility of this being introduced.

The MCIT as a telecom regulatory body (Government) - controls numbering and the two state-owned fixed operators (BakTelekom and AzTelekom) have some informal privileged access to numbering resources. Some possibilities for number portability exist.

There is a firm obligation on communications providers to share infrastructure facilities, although there are no precise unified procedures detailed in legislation. In general, decisions regarding the sharing of facilities are made on the basis of individual negotiations.

There is an awareness of the need to rebalance tariffs; however, due to low income levels in the country, it is proving politically difficult to increase the fees for basic services. The special normative act on Implementation of Universal Services in

Azerbaijan was been adopted on 27 September 2005, however MCIT is still at the early stages of its implementation.

The MCIT uses a domestic system of cost accounting that, it asserts, is largely similar to the methodology used in other CIS countries. However, with no NRA and very limited competition, it is difficult to verify this.

There is limited regulation in the field of leased lines, with few obligations on the incumbents regarding leased line provision prescribed in the rules of the MCIT.

Licensing was greatly simplified in Azerbaijan in 2002, and licence fees are quite low (less than the equivalent of 5,000 Euro for most types).

There is no special national law on data protection, but its main aspects and provisions are reflected in various national laws. It appears that the Government is beginning to look at approximating those provisions with European norms and practice.

1.2 Regulation of Electronic Services

There are some concerns regarding the practical implementation of Azeri e-signatures and e-documents legislation, particularly with regard to how to regulate the activity of e-signature certification centres. The relevant normative act is expected at the beginning of 2007. However, there is very little experience of related legislation in practice, which is why MCIT is taking time to learn from the experience and practices of European countries, especially Estonia.

Issues related to the liability of intermediaries have yet to be fully addressed in Azeri legislation. There is ongoing work on further approximation of national intellectual property legislation with international norms, with the EU experience in the online world being particularly significant, The rules concerning online child abuse images are comprehensive.

1.3 Use of Information and Communications Technologies

There has been sustained growth in both the fixed and mobile sectors, although the fixed sector suffers from a significant urban-rural divide. Mobile penetration is currently at 26.8%,[1] while fixed is only 13 percent.[2] Internet penetration (based on individuals who connected to the Internet in the previous two weeks), based on 2005 figures, is growing quickly, reaching 8% in 2005.[3] Local assembly of computers in Azerbaijan means that computers are somewhat cheaper than in other countries in the study, costing

[1] Based on 'Communication of Azerbaijan' Statistical Yearbook (for 2005)
[2] Data from TeliaSonera, Q2 2005 Report
[3] Official report of Ministry of Communication and Information Technologies made at the International ICN exhibition Bakutel-2006

approximately 350 Euro and equating to around 25 percent of the average annual wage.[4]

In order to achieve the targets set out in the State Programme on Computerisation in Schools, a special computer factory has been set up. There are three further commercial PC manufacturers in Azerbaijan.

Despite relatively low Internet penetration levels compared with European statistics and some unsolved obstacles created by the incomplete reform of the legal framework, there are efforts to launch electronic commerce services in the country.

The National e-Governance Network Initiative, signed in June 2004, aims to improve communication between government and citizens, creating government information centres across the six regions of the country as well as establishing government information portals.

Azerbaijan's score rose from 2.42 (out of 10) to 2.72 from 2004 to 2005 in the Economist e-readiness rankings, getting its best mark for business environment (5.29) and worst for consumer and business adoption (1.6). The score increased again in 2006, climbing to 2.92, with business environment increasing to 5.54 and consumer and business adoption increasing to 1.80.

[4] Based on wage data from the National Statistics Agency.

2 GENERAL ENVIRONMENT

2.1 Influence of Stakeholders on Regulation and Policy

Several business associations involving telecoms providers are having an increasingly significant impact on national ICT policy development in Azerbaijan. This is manifesting itself through the introduction of progressive legislation that seeks to support the growth of ICT and through attempts to convince the Government to withdraw regulatory measures that risk stifling innovation or hindering the process of telecoms liberalisation and privatisation.

Annual business forums are held where representatives of business associations hold discussions with the President and Government representatives regarding the implementation of business-friendly reforms in national telecoms governance. For instance, at a 2003 forum, the then Communications Minister was subjected to strong criticism because of his regulatory policy, and this criticism is widely believed to have led to his subsequent dismissal at the beginning of 2004.

The Azerbaijan Internet Society (which is not part of the international Internet Society)[5] was established to build a coalition of Internet-related civil organisations, Internet communities, universities, academies and research institutes, and ICT stakeholders, in order to strengthen their ability to shape national ICT policy. The Internet Society lobbies for a comprehensive reform of Azerbaijan's ICT regulatory system and it holds wide-ranging dialogue with industry and Government officials, including officials from the MCIT and the incumbent operators, in order to seek mutually acceptable agreements on improving regulation, administration, licensing, certification, tariffs, telecom liberalisation and the privatisation policies of the MCIT and other Ministries. The Internet Society is also very active with regard to the protection of Internet users' rights.

The Azerbaijan ISP Association (AzISPA) was created as an informal grouping, and is now an effective coalition of more than twelve commercial and two state-owned Internet Service Providers, as well as several ICT-related businesses. AzISPA is committed to providing legal, political, and administrative assistance to ISPs, campaigning against alleged anti-competitive practices of the monopoly telecoms operators with regard to the terms and conditions of ISP access to the Internet. AzISPA is also committed to developing united policies and positions on crucial aspects of state policy affecting ISPs. Specifically, AzISPA has called for transparency and simplicity in the licensing and certification requirements of ICT operators and with regard to interconnection rules, and advocates explicit procedures for liberalisation and privatisation in the telecoms market.

Certain international groups have consistently made efforts to approach MCIT to explain the steps that they believe are required to enhance the Azeri communications market, and the use of ICT in business more generally, through suitable regulation (the American Chamber of Commerce in Azerbaijan (AMCHAM), the Commercial Service of the US Embassy in Azerbaijan,[6] the UK and German Embassies, and the Turkish

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[5] http://www.isoc.org

[6] http://www.ustrade.gov

Industrialists' and Businessmen's Association[7] are some examples). For instance, AMCHAM[8] supports and monitors the implementation of the procedures and regulation needed for the liberalisation of the market and the creation of new telecom providers (including Voice over IP and mobile providers), in order to ensure fair conditions and open competition for all entities operating within the ICT area.

The official registration of associations is carried out by the Ministry of Justice in accordance with the National Law on Legal Persons Registration. Flaws in several provisions of the Law enable administrative officials in the Ministry of Justice to delay – and in some cases even to refuse – the registration of associations, especially NGOs and Joint Ventures.

2.2 National Development Plan

The National Information and Communications Technology Strategy for the Development of the Republic of Azerbaijan (2003-2012) was launched by the President in February 2003 and was developed in cooperation with the UNDP. The primary aims of the Strategy include assisting with democratic development, improving national communications infrastructure, information security (including data protection) and international links, developing e-Government and e-Learning and ensuring favourable conditions for the transition to a knowledge-based civil society by 2011.

The Strategy assesses the country's strengths and weaknesses as well as the most appropriate role for the State in leading ICT sector development. To this end, it identified the development of ICT awareness, transparency, equality, innovation and international cooperation, taking the lead in the implementation of ICT tools, and the development of national information resources as the key areas where the State could play a role.

While some progress has been made in certain aspects of the Strategy (such as the adoption of new legislation on telecommunications), few measures have been taken that specifically address priority issues identified in the overall strategy, and no well-defined procedure is in place to measure progress towards long-term goals.

Additionally, the Electronic Azerbaijan Plan (2005-2008) was launched in 2005 with the specific aim of bringing ICT up to EU levels within 3 years. Internal government evaluations of work to date are reported to be positive.

2.3 Data Protection

The possibility of ratifying the Council of Europe Convention on the Automatic Processing of Personal Data is currently under discussion among the relevant ministries. The Azerbaijani government regards data protection as a serious issue and the creation of a national information security system will be developed in the framework

[7] http://www.tusiad.org/indexeng.htm

[8] http://www.amchamaz.org/

of the forthcoming State Program on the Development of ICT in Azerbaijan. For the moment, however, there is no specific national law on protection of personal data, the data protection requirements are scattered over provisions of the national constitution and several laws. This creates obvious difficulties in harmonising national law with the relevant EU and CoE norms.

The MCIT's Annual Report in 2005 referred to the need to improve the regulatory environment for e-commerce, which implies the need for improvements in data protection. However, no specific plans have been announced.

2.4 Cybercrime and Spam

Azerbaijan has neither signed nor ratified the Council of Europe Cybercrime Convention, but has signed and ratified the Optional Protocol of the Convention on the Rights of the Child on the Sale of Children, Child Prostitution and Child Pornography. Article 9 of the Cybercrime Convention, Article 34 of the UN Convention on the Rights of the Child and Article 7 of the Optional Protocol are applied through the relevant state authorities.

Azerbaijan has very strict child pornography legislation, which is in accordance with the requirements of many international conventions in this area. Relevant international law takes priority over national law, as with every aspect of Azeri legislation. Azerbaijan's constitution has provisions that make international conventions "self-executing" in domestic law. However, most domestic law regarding illegal content and access to information are stricter than international law dictates.

According to current legislation (the national laws on Communication (1997) and Information (1998) and the newly adopted Telecommunications Law) operators of telecommunications services are not obliged to bear responsibility for the information being sent over their telecommunication networks, until informed this is illegal.

Some deputies, in particular the Deputy Chairperson, (Mrs Bahar Muradova) of the National Parliament have proposed an initiative to set up a citizens' group that will run a national hotline to report illegal material such as copyright infringements and child pornography. This will be organised in conjunction with the Azerbaijan Internet Society. There are, however, no practical steps has been undertaken for Azerbaijan to establish procedures to accept reports of illegal material from other countries even when this has been assessed by national hotlines.

The process of adapting current national copyright laws in Azerbaijan to address relevant online issues is under way. Azerbaijan has not acceded to the WIPO Copyright Treaty or the WIPO Performance and Phonograms Treaty. However, in view of further adaptation of Azerbaijan to European norms, it will be necessary to bring national copyright legislation into line with the requirements of European legislation.

The two key pieces of cyber-security legislation in Azerbaijan are the Law on National Security from 29 June 2004 and the Law on the Protection of unsanctioned Information Collection of 14 September 2004. Chapter 30 of the Azerbaijan Criminal Code covers wide-ranging aspects of unauthorised access to, and breaches of the security of, computer systems, including the development and use of computer viruses.

The issue of unsolicited electronic communications has not been comprehensively addressed in Azerbaijan.

3 REGULATORY ENVIRONMENT FOR ELECTRONIC COMMUNICATIONS

3.1 Interconnection

The 1997 Communications Law, the 1998 Information, Informatisation and the Protection of Information Law, and the 2005 Law on Telecommunications govern interconnection in Azerbaijan.

Tariffs (both retail and wholesale) of the state-owned operators (such as the two big operators Aztelekom and Baktelekom) are established and overseen by the Inter-Ministerial Tariff Council, acting under the supervision of the Ministry of Economic Development. Other commercial operators are able to set their own tariffs.

All telecoms operators are required to mutually facilitate interconnection. Formal commercial agreements are required for this purpose. If agreements cannot be reached, operators risk losing their licences and being forced to cease trading. In the absence of specific dispute settlement procedures, interconnection disputes are settled by the courts based on the 1997 Law on Communication, the 2005 Law on Telecommunications, and other Ministerial normative acts and regulations. The basic principle is that there should be no barriers to the use of the country's public communications infrastructure. The Ministry for Communications and Information Technology is expected to draft new secondary legislation regarding interconnection, as the 2005 Law on Communications sets out principles rather than procedures for facilitating interconnection.

There are five fixed line operators and three fixed CDMA operators. Commercial fixed line operators mostly operating on the Absheron Peninsula, fixed CDMA operators are broadening their network coverage also in other regions. This explains why fixed line interconnection is mostly concentrated on the Absheron Peninsula. Also, the major ISPs have developed their own infrastructure, including VSAT technologies. Revenue sharing is not available to dial-up ISPs.

According to the MCIT,[9] facilitating carrier selection/preselection is currently beyond the capabilities of the incumbents, Aztelekom and Baktelekom, and there are no special provisions for dealing with this issue in the 2005 Law on Telecommunications.

There are two GSM mobile operators, Azertel[10] and Bakcell,[11] both of which compete with the incumbent in data transmission. A third GSM operator Azerphone has only recently begun to establish its own network. The CDMA mobile operator Catel has relatively small client base.

In interviews undertaken for this research, MCIT indicated that it was seriously concerned that the increasing use of VoIP services was reducing income from outgoing international calls by at least 15 percent.

[9] Based on interviews undertaken for this project.
[10] http:// www.azercell.com
[11] http://www.bakcell.com

3.2 Numbering

Under the Law on Telecommunications, which was adopted by the Parliament and ratified by the President in June 2005, numbering is classified as a national resource. Numbering policy is managed by the MCIT, which is required to provide equal access to numbering resources. Specific rules on the management of this national resource are still under consideration, although it is expected that they will be published in the near future.

Number resources can be withdrawn if unused for two years after allocation and may only be sub-allocated or shared upon state approval.

Up until the new rules came into force, the two state-owned fixed-line operators had privileged access to numbering resources, while the mobile CDMA provider CATEL uses its own unique numbering system.

Number portability is available for both fixed and mobile services, to the extent that this is technically feasible. Only mobile portability is available free of charge.

3.3 Rights of Way and Facilities Sharing/Collocation

Despite the existing special regulation by MCIT there are no well-defined prescribed procedures for the sharing of operators' infrastructure facilities. Due to the lack of specific regulation, decisions regarding the sharing of facilities are mostly made on the basis of individual negotiations. However, as the majority of telecoms facilities are controlled by the State-owned operators, in most cases incumbents have obvious privileges. All appeals on this issue are made before a MCIT Board and State-owned operators are legally bound by any decision made in this regard.

There are no well-defined procedures for collocation, although the Law on Telecommunications has introduced general principles for the negotiation of collocation. It is expected that although the new law will allow owners of different networks to initiate collocation procedures, although the final approval of any decision will still remain with the MCIT.

The major private communications companies tend to prefer to build their own networks and minimise their technological dependence on the facilities of the incumbents.

3.4 Tariff Policy

The Inter-Ministerial Tariff Council sets the tariffs for all telecommunications services provided by state entities in Azerbaijan. The stated government goal in price regulation is to ensure a business-friendly environment, with prices based on costs and to restrict unfair competition. However, no publicly declared frameworks or timetables for tariff rebalancing have been established. The relatively low level of income earned by the majority of the country's population makes it exceptionally difficult to significantly increase local call charges.

From time to time, MCIT initiates public discussions on implementing metering of local calls. However, this is always met by a very negative reaction from citizens, which makes it difficult on a political level to introduce change. Hence, to date, there has been no determined effort made to rebalance tariffs and there has therefore been little in the way of moves to reduce or eliminate price differences between local, regional and national calls, to reflect the actual cost of the service. However, there has been some reduction in the prices of regional and international rates recently: this is partly due to Government efforts at rebalancing and partly due to competition.

Local calls (even between different fixed operators) are free of charge and line rental remains very low (0.5 Euro per month). The cost of calls from mobile to fixed or vice versa are, by contrast, quite expensive at approximately 0.26 Euro per minute. Interregional fixed to fixed calls cost 0.09 Euro per minute.

The number of outgoing international call minutes as a percentage of incoming minutes decreased from 41 percent in 2001 to 24 percent in 2004. Outgoing calls from Azerbaijan cost 1.35 Manat (1.21 Euro) per minute for CIS states and Baltic countries; 2.70 Manat (2.41 Euro) for Turkey and Iran; 3.24 Manat (2.90 Euro) for European countries; and 4.32 Manat (3.86 Euro) for the USA

3.5 Cost Accounting

MCIT uses a domestic system of cost accounting that, it asserts, is largely similar to the methodology used in other CIS countries. The system was developed jointly by the MCIT and the MED. The oversight of this cost accounting system is carried out by the MCIT, so external verification of this model is not possible. It is the MCIT's view that the cost model has elements in common with EU cost models and is reasonably transparent and comprehensive. However, key elements of the model are not public and therefore this cannot be verified.

The most important tariffs for incumbents are set up Tariff Council, however there is no available information regarding the costing mechanism that is used by the incumbents (Aztelekom and Baktelekom) to determine pricing for access to key elements of their networks.

3.6 Universal Service

The MCIT has declared on numerous occasions that implementing universal service is a fundamental goal of Azerbaijan. This was outlined in the State Programme on the Development of ICT in Azerbaijan (which runs from 2005 to 2008) as well as the 2003 National ICT Strategy of Azerbaijan. Universal service is stated again as a key government policy in the 2005 Law on Telecommunications. The MCIT also has adopted a special ministerial regulation on Universal Services implementation.

However, further guidance is needed from the MCIT to detail the costing, implementation and administration of a universal service system.

All the main telephone companies already offer selective call barring services to customers.

Most of the obligations currently placed by the State on telecommunications service providers relate to ensuring the delivery of specified levels of quality of service.

In line with several other countries in this study, Azerbaijan has embarked on a focussed effort to increase basic access to communications in smaller towns and villages. Current plans are to ensure that:

- Settlements of 50-200 people be given access to local, inter-regional and international telephony services, access to information services (directory enquiries) and emergency services.
- Settlements of 200-1,000 people, in addition to the above, are to be given access to the Internet.
- Settlements of 1,000 to 10,000 people, in addition to the above, be given data transfer and fax services.

Unusually, these services are seen by government as a long-term investment for telecommunications companies. Therefore, they will be lent the money to develop these services and will have to repay this debt.

3.7 Local Loop Unbundling

LLU currently does not exist in theory or in practice in Azerbaijan. In order to mandate LLU, it would be necessary to enact specific legislative and technological provisions. It is expected that much of the legal basis for LLU will be determined according to the existing national ICT legal framework. In theory, the MCIT does have the power to require a change in any RUO that may be produced by the incumbent operators, if it deems this to be insufficient. Information relating to telephone exchanges is currently being gathered by the Global Internet Policy Initiative[12] in order to help promote competition.

The Law on Communications places obligations on the incumbent to create suitable conditions for the hosting of new entrant equipment. No other details on this area are contained in existing laws.

3.8 Leased Lines

The MCIT has yet to state publicly its approach to the regulation of leased lines. Although the existing specific normative acts of MCIT regulating the leased lines sphere are not comprehensive, the policy of MCIT and MED is to reduce tariffs gradually on leased lines whilst attempting to simplify regulation.

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[12] http://www.gipi.az/eng/about.shtml

The maintenance and repair of leased lines as well as other telecoms equipment is carried out according to their level of usage. The regularity of routine repairs is established by the MCIT. The incumbents providing the leased lines carry out technical maintenance of these lines over the whole leasing period.

It has been known to happen that MCIT and the incumbents (Aztelekom and Baktelekom) apply the same tariffs for old copper telephone lines and new fibre-optic lines.

Sample prices (Aztelekom) for a variety of prices/lengths of leased line

Leased lines per month prices +VAT	64kbps	2 Mbps	34Mbps
Up to 50 km in length	15.57 US$ (12.81 Euro	US$ 191.49 (157.88 Euro)	4,742.55US $ (3,910 Euro)
One-off payment for connection	255.32 US$ (211.01 Euro)	447.80 US$ (369.21 Euro)	757.89 US$ (624.88)

Aztelekom publishes statistical information regarding service availability for the above options on its website.

State operators sometimes refer to the existence of technical limitations when they refuse the requests of commercial operators to connect their leased lines to public networks.

The available speeds for leased lines are 32kbps; 64kbps; 128kbps; 192kbps; 256kbps; 384kbps; 512kbps; 768kbps; 1024kbps; 2048kbps; 8mbps; 34mbps; and 155mbps.

The latest tariffs (per month) for satellite international leased channels in Azerbaijan are as follows:

Tariffs (per month) for satellite international leased channels

Symmetric	
Speed	**Price**
64Kbit/s	1,560US$ – 1,286 Euro
128Kbit/s	2,585US$ – 2,131 Euro
256Kbit/s	4,335US$ – 3,574 Euro
512Kbit/s	6,705US$ – 5,528 Euro
1024Kbit/s	10,565US$ – 8,711 Euro
2048Kbit/s	15840US$ – 13,060 Euro

Asymmetric	
Speed	**Price**
512/128Kbit/s	3960US$ – 3,265 Euro
768/192Kbit/s	5420US$ – 4,468 Euro
1024/256Kbit/s	6345US$ – 5,231 Euro
2048/512 Kbit/s	10085US$ – 8,315 Euro

The MCIT has also ordered the building of extensive fibre-optic networks in outlying areas to facilitate the provision of services by telecommunications providers. This move aims to provide the infrastructure to permit cheaper and more efficient access to networks for the approximately 70 percent of the Azerbaijani population that lives outside of the capital. The new infrastructure also aims to allow the country to capitalise efficiently on its geographic location, which gives it access to several major backbones, such as the Trans-Asia-Europe fibre-optic line.

3.9 Mobile Services

There are two GSM (Azercell[13] and Bakcell[14]) operators providing services to the vast majority of Azeri mobile users. The third GSM mobile operator Azerphone has only recently begun to set up its own network infrastructure. It should start offering services at the beginning of 2007. Azercell controls approximately 83 percent[15] of the market, with Bakcell accounting for approximately 15 percent[16]. CDMA2000 provider CATEL[17] caters for the remaining (approximately) 2 percent of the market.[18] There are no MVNOs in the market.

The total number of subscribers is 2,242,000 (2005)[19] indicating an overall mobile penetration rate of 26.8%.[20].

A third GSM operator, Azerphone, is due to enter the market in early 2007 It is owned by Siemens (30 percent) and Aztelekom (10 percent). The remaining 60 percent are apparently owned by UK companies Celex[21] and Extel.[22] Azerphone has announced plans to invest almost 250 million Euro over the next two years.

A three minute mobile call costs 1 AZN (0.89 Euro) from Azercell to another network, while an SMS costs approximately 0.04 Euro.

For comparative purposes, monthly fixed line rental is approximately 0.60 Euro, while local calls are free.

GPRS services are provided by both GSM operators. The cost of a GPRS service from Azercell, as an example, is 0.02 AZN/50kb (0.018 Euro). EDGE services are offered by Azercell. Internet services are also offered by Catel

The vast majority of users are prepaid, 95 percent in the case of Azercell customers. Statistics relating to the number of SMS messages being sent are not available but it is believed that the popularity of SMS is growing rapidly. There are also no statistics available regarding the level of data service use.

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[13] http://www.azercell.com/en/index.shtml

[14] http://www.bakcell.com/eng/index.html

[15] According to TeliaSonera's annual report 2004

[16] See http://www.comnews.ru/index.cfm?id=16858

[17] http://www.catel-az.com/eng/news.htm

[18] See http://www.comnews.ru/index.cfm?id=16858

[19] Based on 'Communication of Azerbaijan' Statistical Yearbook (for 2005)

[20] Based on 'Communication of Azerbaijan' Statistical Yearbook (for 2005)

[21] http://www.celexuk.com/

[22] http://www.extel.co.uk/default.asp

3.10 Satellite Services

Satellite communications services are offered by the main satellite telecom service providers Delta Telecom (previously known as AzerSat LLC),[23] Aztelekom,[24] and AzEuroTel.[25] Delta Telecom (Azersat) is the country's biggest satellite and fibre-optic backbone provider. Approximately 10 percent of households[26] have satellite dishes, which are mostly used for television services. Some home users also use satellite links to access the Internet.

Delta Telecom has built a HughesNet[27] Network in Baku, offering data transmission, IP backbone and high-speed Internet services to large clients such as the International Bank of the Azerbaijan Republic and the Seismology Data Centre.

Separate telecommunications services are provided to business users. For example, banks use satellite links to connect the ATM network with regional branches and federal Ministries use satellite links to communicate with regional departments. Corporate satellite communication networks have been created for IBAR, Capital-Bank, the State Customs Committee, the Ministry of Finance, the Ministry of Internal Affairs and the Ministry of Taxes.

VSAT services provide two-way Internet services and telephony.

At present, television companies broadcast from separate satellites but are planning to move to a single satellite so that all home users can receive channels through a single satellite dish. Services are also available using TDM/TDMA and SCPC technologies. It is predicted that DVB Broadcasting will also be available in the future.

ISPs use satellite services as a backup to IP backbone connections. In addition, three of the country's twenty four ISPs use their own satellite connections facilities - JV AzEurotel,[28] JV ADANet, and AzCom . Different ISPs also use the satellite links to deliver Internet services to regional corporate clients, state bodies, regional universities, Internet cafes and home users. Some of them use satellite connectivity to backup their terrestrial backbone connections.

A satellite terminal 3 TxPx VSAT has been installed in the framework of the Virtual Silk Highway Project.[29] This is a NATO project that provides satellite-based networking to the academic communities of Central Asia and the Caucasus. The Silk Project has created a virtual information highway to integrate academic computer networks in each of the countries involved. It may also increase regional cooperation between the research and educational centres of Azerbaijan. It was hoped that Silk Project would increase satellite channel capacity from 3mbps to 24mbps by the end of 2004. However, the most recent

[23] http://www.azersat.az

[24] http://www.aztelekom.net

[25] http://www.azeurotel.com

[26] According to IREX- International Research and Education Board

[27] http://www.hughesnet.com

[28] http://www.azeurotel.com

[29] http://www.silkproject.org/

information suggests capacity is currently only 5 Mbps. Extended capacity will pave the way for further developments, such as distance-learning systems.

MCIT is promoting the widespread usage of satellite technologies, together with Wi-Fi, as a low-cost alternative for remote rural communities lacking sufficient incumbent telecommunications infrastructure. A problem relating to regulatory restrictions in this area is connected to the system of licensing and certification. In order to provide satellite services, it is necessary for companies to obtain a licence and certificate from the MCIT. However, the procedure for this is somewhat confusing and new operators frequently find it difficult to obtain the official licences and certificates.

Leased satellite connections are significantly more expensive than leased lines, ranging from 3,960 US$ (3,273 Euro) for a 512kbps/128kbps connection to 10,085 US$ (8,334 Euro) for a 2048kbps/512kbps connection. A full price list is available from:
http://www.mincom.gov.az/new/download/news/hisse1.doc

The Nakhichevan Autonomous republic, which is an enclave between Iran and Armenia, has its communications services supplied via satellite.

The national NREN, AzRENA,[30] has its own dedicated satellite channel.

3.11 Status of the National Regulatory Authority (NRA)

There is no independent national regulatory authority in Azerbaijan. The basic regulatory functions are carried out by the Ministry of Communications and Information Technologies.

In February 2004, the Ministry of Communication was converted into the Ministry of Communications and Information Technologies (MCIT). The new MCIT was intended to have a purely regulatory function, rather than have responsibility for the commercial aspects of the communications sector in the country, as the old Ministry had. The MCIT was thus established as a high-level policy body within the Government, responsible for promoting the development of the ICT sector, by creating a favourable regulatory environment and monitoring the implementation of ICT projects nationwide. The MCIT statute requires regulation to be transparent, non-discriminatory and that pricing should be cost oriented.

However, MCIT still has ownership of the dominant incumbents, Aztelekom and BakTelecom and maintains state shareholding in many alternative operators. This means it intervenes in the market as both a regulatory authority and as an operator and risks being prone to acting in the state-owned concerns' interests. The incumbent operators' directors are board members of the MCIT and it is their duty to participate in all decision-making processes. Being a part of the MCIT structure, Aztelekom and its staff are at the disposal of the Ministry.

There is no defined procedure for consultation with wider ICT business stakeholders or civil institutions. From time to time, MCIT holds meetings and round tables where market

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[30] http://www.azrena.org/

players are given the opportunity to discuss regulatory issues and to request the minister deal with problems in the marketplace. However, in practice, all issues are discussed in MCIT Committees where the incumbent has a strong presence.

Thus, the two major factors hindering the development of the telecommunications sector in Azerbaijan are the lack of an independent NRA, which is currently planned by the MCIT, and the incomplete processes of liberalisation and privatisation of incumbent operators and state shares in other joint ventures.

The MCIT holds power over the setting up of joint ventures (JV) in telecommunications, being the co-founder of more than 20 JVs operating in the ICT sphere, although the management of these joint ventures and the fixing of tariffs for telecommunication services falls under the responsibility of the Inter-Ministerial Tariff Commission under the Ministry of Economic Development (MED).

According to the Statute of MCIT endorsed by Presidential Decree 111 of 10 August 2004, MCIT is the central executive body which formulates and implements state policy, ensures the regulation and development of communications and information technologies, and coordinates the activities of other Government agencies in the areas of communications and information technologies in the Republic of Azerbaijan.

The Statute defines the main organisational and legal basis, and duties of the Ministry to be:

- to formulate and implement unified state policy and regulation in the field of communication and information technologies;
- to take measures for creating new forms of social and economic activity through mass use of information technologies;
- to convert information into a commodity;
- to provide state control over the activities conducted in the field of communications and information technologies, including the use of radio-frequency spectrum, as well as the use and maintenance of satellite communication facilities;
- to be involved in developing and implementing necessary measures for meeting the demands of state bodies, municipalities and physical and legal entities for communication and information technologies services;
- to prepare and approve legal normative acts and standards regarding issues under the scope of the Ministry;
- to determine traffic rules in common-use communication networks, as well as mutual payment principles for traffic exchange among all communications operators;
- to supervise mutual accounting transactions with communications operators of foreign countries for the exchange of international traffic;
- to take measures within its scope for the formulation and development of e-Government and the e-economy and;
- to carry out the construction, development and improvement of cable networks, exploitation of cable broadcasting signals systems and use of frequency and channels, together with other state agencies in a manner defined by the law.

The possibility of the creation of an independent NRA is being actively discussed in Azerbaijan. One Government source has suggested that such an authority would have a purely regulatory function, unlike the MCIT which is a significant, dominant commercial force in the sector. Such an NRA would probably manage the implementation of market-oriented reforms in the national telecoms market. In addition, MCIT recently undertook a large project with USTDA (the United States Trade Development Agency) with the aim of reforming the structure of the MCIT and preparing for the establishment of an independent regulatory body in Azerbaijan. However, the 2005 national Law on Telecommunications makes no direct mention of plans to establish a new regulatory body and instead suggests Azerbaijan should reform the telecoms sector as necessary to help achieve WTO accession.

3.12 Licensing and Authorisation

In 2002, a major reform of licensing in Azerbaijan reduced the number of business activities requiring licences from more than 240 to approximately 30, covering all sectors of industry. The validity period of licences was extended from two to five years. According to Presidential Decree 782, of 2 September 2002, MCIT licences are granted for telephone, cellular, paging, radio trunking, installation and operation of CCTV and courier services. The MCIT is responsible for monitoring compliance with licence conditions. Licences are issued within 15 days of submission of all relevant documentation and payment of the appropriate fee, which is 5,500 Manat[31] (4,916 Euro) for most services. Licences may not be transferred.

Decree 782 unified licensing rules for all types of licences and permitted the issuing of licences, with some limited exceptions, to foreign investors.

The 2005 Law on Telecommunications also includes rules covering licensing for telecommunications service provision. However, secondary legislation, which has yet to be published, is needed for these measures to be implemented and explained in more detail. In January 2006, the Ministry for Communications and Technology announced plans to change from the current situation, where one licence covers all telecommunications services, to a system with a variety of differently priced licences.

The 2005 law also covers the certification of communications equipment, although the scope of such requirements is yet to be clarified. There is concern among some industry players that this lack of clarity could translate into arbitrary actions on the part of government authorities, making it more difficult and expensive to provide telecommunications services.

Restrictions on ISPs have also been eased by the 2005 Law, which is intended to give a boost to competition in the Internet access and service provision markets.

3.13 Spectrum

The regulation of the allocation of radio frequency spectrum in Azerbaijan is dispersed across a number of different Government institutions. The main relevant state authority

[31] Decree of the President of Azerbaijan Republic № 782 dated 2 September 2002

is the Azerbaijan State Committee on Radio Frequencies (ASCR) acting under the authority of the MCIT. Another relevant authority is the National Council on Television and Radio Broadcasting, which allocates frequencies for Television and Radio Broadcasting. A third authority is the Commission on Radio Frequencies acting under the authority of the Cabinet of Ministers. The role and functions of the Commission are not defined in any great detail. The Commission develops and implements State policy with regards to the deployment of spectrum. All other authorities dealing with radio spectrum are under its general control.

Frequency is allocated in accordance with the provisions of the General Regulation of ASCR (1996), although these regulations are quite outdated. It was anticipated that new rules in this policy area would be included in the Law on Telecommunications. However, the 2005 Law on Telecommunications does not significantly change the specific details of regulation of radio frequency in Azerbaijan. The ASCR is in the process of putting together a national frequency allocation table, but this is not currently in place, limiting the authorities' ability to manage spectrum efficiently. The MCIT has announced that the new rules for spectrum allocation will be targeted at more efficient, commercial usage.

4 REGULATORY ENVIRONMENT FOR ONLINE SERVICES

4.1 Digital Signatures

Article 336(3) of the Civil Code of Azerbaijan allows the use of electronic means in written sale agreements, including confirmation of documents by means of electronic digital signatures when all parties to an agreement accept this.

According to Article 3(1) of the Law on E-signatures and E-documents (2004), an e-signature can be deemed invalid simply on the grounds that it is in electronic format and does not have a certificate or has not been created by a certified authority. The subsequent provision of the same article says that only electronic signatures created by certified means and using an advanced signature certificate possess equal legal status to signatures in paper form. The definition of advanced certificate one that "*contains the information on a signature provided by an accredited centre of certification services*" (article 1.11).

According to article 36(3), the parties bear individual responsibility for the usage of non-certified means of electronic document circulation and electronic signature, i.e. parties are deprived of legal protection if they use electronic signatures in such circumstances.

Five legal acts[32] were adopted at the beginning of 2006 in order to clarify and regularise the situation of digital signatures in the country. In addition to accreditation, a certification centre must also pass an obligatory registration process in the appropriate state body before commencement of activity. It is not yet clear which state body will fulfil this task, although it appears likely that it will be the MCIT. The ministry intends to start providing this function early in 2007.

Foreign electronic signatures are permitted but they need to be confirmed as being in line with the rules of their country of origin. This means that, while local accreditation is not yet possible, there are no legal barriers to using digital signatures which have been appropriately accredited abroad.

The government's stated commitment to e-government, for reasons of efficiency, transparency and support for the development of the wider ICT industry are expected to fuel demand for e-document and e-signature services.[33]

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[32] Rules on Verification (testifying/checking) of e-signatures' (http://www.mincom.gov.az/new/download/qaydalar/027-28-01-06.rtf), Guidelines for registration and accreditation the centres issuing e-signature certificates and delivering e-signature-related services, Guidelines on issuing certificates and maintenance register on e-sign certificates; Rules on using e-sign in state gov and local gov bodies; and Guidelines on e-document circulation http://www.mincom.gov.az/new/download/qaydalar/027-28-01-06(add).rtf

[33] See, for example, Speech of Minister Ali M. Abbasov at the World Bank e-Government workshop, 26 April 2005. http://siteresources.worldbank.org/INTEDEVELOPMENT/Resources/559323-1114798035525/1055531-1114798256329/1055556-1114798371392/Abbasov.pdf

4.2 Payment Systems

The legislative system for e-payments is adapted from European practices. Commercial regulatory law is outlined in the Civil Code of Azerbaijan and in the law on "e-Commerce." The e-commerce law covers the rules for online commercial operations, covering conclusion of contracts and online payments. The Ministry of Taxes, the Ministry of Social Insurance, the State Customs Committee and the Ministry of Economic Development are the bodies responsible for the establishment and implementation of e-payment systems.

The banking and financial sector have pushed the use of e-payments forward through the introduction of credit card and online payment systems for conducting e-commerce. For example, a new electronic payment system to allow money to be transferred between cardholders – and even to non-cardholders – has been launched in Azerbaijan.[34] This is in line with the 2005-2007 State Programme on the Implementation of a National e-Payment System. This plan[35] foresees a wide range of e-payments innovations, with ownership of each project being given to named ministries and agencies, with implementation taking place between 2005 and 2007.

[34] http://www.rabitadunyasi.info.az/rd/dim.asp?id=3353
[35] http://www.nba.az/download/o_sistemi/dprengimpl.xls

5 Use of Electronic Communication Services

5.1 Fixed Telephony Penetration

Most areas of Azerbaijan have a relatively high degree of telecommunication service coverage when compared with the other countries examined in this study. All rural regions have some digital switches, usually in the district centres. Before 2003, most had analogue switches. Fixed telephony networks are present in almost all villages in Azerbaijan, including those that are close to the borders of neighbouring countries. Hard-to-reach and mountainous territories are connected by microwave links and analogue switches.

In 2004, more than 31 percent of rural households had access to fixed telephone services in their homes. According to the State Project on the Development of a Road Map for Rural Telecommunication, all rural mountainous areas in villages with more than 100 inhabitants have radiophone networks.

Fixed Phone Lines (MCIT Statistics)[36]

	1995	2000	2001	2002	2003	2004	2005
Number of fixed phone lines per 1000 inhabitants	85	100	107	114	115	122	137.9

5.2 Mobile Usage

Mobile communication is currently the most rapidly developing field of electronic communications in Azerbaijan. In 2004, the penetration rate was 16.45 percent of the total population, with 1.4 million subscribers. The penetration rate reached 26.9 percent in 2005.[37]

In some urban areas, the number of mobile users has already outnumbered the number of fixed line users.

5.3 Cable Services

A survey carried out by a partnership of various international organisations, including Internews, calculated that in March 2006 5.1 percent of households in Azerbaijan are connected to cable networks.

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[36] Based on 'Communication of Azerbaijan' Statistical Yearbook (for 2005)
[37] State Statistical Committee of the Republic of Azerbaijan - http://www.azstat.org/publications/azfigures/2006/en/016.shtml

5.4 Computer Availability

According to official statistics the computer penetration is 2.3%.[38] The overwhelming majority of PCs that are in use belong to public authorities and private companies and are used for clerical work. The number of computers used for private purposes is still very low; however, this has been changing in recent years and the number of individual users is growing. The main reasons for this are the growth in Internet use and a reduction of user charges for Internet access.

The average cost of a basic computer (P4/40Gb/DDR256Mb) is about 350 Euro due to low-cost, local assembly of computers. The average monthly salary was 86 Euro in 2004.[39] Thus, the cost of a computer was equivalent to about 3.5 times the average monthly salary.

Information obtained from the Ministry of Education indicates that only 2,053 computers (modern generation Pentium, Celeron and similar) were used in the secondary education system, which works out at 1 computer per 990 pupils. All schools in the main cities offer information technology classes, although outdated computers were used for 60 percent of them. In the regions, only 26 percent of schools had computer education. Overall, therefore, the situation is significantly worse in the regions than in urban areas.

Following a Presidential Decree on 15 August 2004, the State Programme on the Provision of Information Technologies in Secondary Schools was launched. The programme will be implemented in three phases and 16.44 million Euro has been allocated from the State Budget to supply 4,521 secondary schools with computer equipment over the next 3 years. The programme will provide one PC for every 33 pupils and it will create employment for more than 3,400 teachers and 4,500 laboratory assistants. The computers will reportedly use open source software.

To facilitate the program, the Mingechevir computer plant is being constructed. It will be the main manufacturer of PCs for schools.

With regards universities, the situation is somewhat better in Baku, where there is one computer per 124 students, compared with one for 283 students in the universities of Sumgayit and Ganja.

5.5 Internet Access

There are currently 24 Internet access providers in Azerbaijan, providing a wide range of services. The price of a one-hour dial-up connection has dropped by 75 percent over the last ten years. Prepaid and post-paid Internet access cards have been introduced to the market to offer customers greater choice.

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[38] Based on ‘Communication of Azerbaijan’ Statistical Yearbook (for 2005)

[39] State Statistical Committee of Azerbaijan.

Prices for Internet dial-up access can vary depending on whether the user is in Baku or in the regions.

Cost of Dial-up Internet Access (AzEuroTel) [40]

Service Name	Price in Baku		Price in Other Regions	
	AZN	EUR	AZN	EUR
Price of 1 hour Internet access	0.40	0.36	0.36	0.32
Monthly subscriber payment for additional e-mail address	1.60	1.43	1.60	1.43
1 statistic IP - address	2.00	1.79	2.00	1.79
Unlimited access	40.00	36.00	36.00	32.00

Note: Prices do not include 18 percent VAT

AzEuroTel has a very wide range of ADSL price offerings, the following is a sample of the slowest, fastest and mid-range speeds.

Cost of ADSL access per month (AzEurotel)

Speed	AZN	Euro
64/64	40,68	36.36
256/128	127,12	113.63
256/256	144,07	128.78
512/512	338,98	303

Note: Prices do not include VAT of 18 percent and an installation fee of 13.56 AZN/12.14 Euro

5.6 Public Internet Access Points (PIAPs)

There are more than 450 Internet clubs in Baku, the main cities and several other regions, which were established by the private sector. Internet centres established by the state authorities also exist. In the state-run Internet centres (which number over 31 and which are located in various regions of the country), Internet access and basic computer knowledge classes are taught.

There are also a significant number of free Internet access points provided in universities, internet cafes and in the growing number of wireless hotspots (see below).

Under the framework of programmes initiated by OSI,[41] UNDP[42] and IREX,[43] 14 network e-libraries have been created and are based in the central libraries of the capital and other main cities. All of them are well equipped with computer networks and provide people with free Internet access.

[40] http://www.azeurotel.com
[41] http://www.soros.org/
[42] http://www.undp.org/
[43] http://www.irex.org/

5.7 Wireless Internet Access

The wireless access services market is one of most dynamic growth markets in the ICT sector and is expected to become a key means of broadening public access to information resources. Today, the campuses of several universities in Baku and the central area of the National Park in Baku are already covered by free wireless access services. The local telephone companies ULTEL, Catel and AzEuroTel have announced their plans to provide wireless services at all universities, central libraries and public places in the capital. Intel is heavily involved in supporting the roll-out of these services.

6 AVAILABILITY OF ONLINE SERVICES

Azerbaijan was the only country from the southern Caucasus, and one of only four CIS countries, included in the list of 68 countries of the Economist e-readiness report although it was in last place.[44] Azerbaijan received 2.92 points out of a possible 10 (having received 2.37 in 2002) and has improved its score a little each year. Denmark was first at 9.00. Of the other CIS countries Russia, Ukraine and Kazakhstan were 52nd, 61st, and 64th respectively with ratings of 4.30, 3.62, and 3.22 points.

6.1 E-Commerce

The National Communication and Information Technologies Strategy for the Development of the Republic of Azerbaijan focuses on improving e-governance, the e-competence of enterprises, and the availability of infrastructure for conducting e-business and e-commerce.

The State Statistics Committee only collects general data relating to ICT industry activity and therefore there is no relevant detailed information on e-commerce specifically. Overall, ICT products and services are worth 467 US$ (386 million Euro) million per year.[45]

The Azerbaijan Internet services market is growing rapidly. Businesses are showing more and more interest in the Internet, as indicated by growth of over 100 percent in the overall value of communications services from 2000 to 2004.[46]

E-business in Azerbaijan is in a stage of intensive development, with B2C growing more rapidly than B2B. The steadily growing number of local companies in Azerbaijan has allowed the development of B2B e-commerce applications. However, the majority of B2B transactions are still being carried out in traditional ways, through phone, fax or paper-based communications.

There is also a growing number of auction sites in Azerbaijan. Many Azerbaijani portals and major sites are endeavouring to trade and conduct auctions. These sites usually offer advertisements with descriptions of goods for sale or purchase. There are two main websites (www.auction.az and www.bazar-az.com) that aim to encourage e-trade and information exchange in the countries of the Caucasus, Middle Asia and Europe.

Various industries are represented at www.bazar-az.com. The site features databases of producers, product descriptions and prices. It also contains information on product delivery and transportation infrastructure. This site gives information in Russian, English, Persian and Turkish. It is possible to buy and sell products as diverse as cars, paper, oil and corn via the site. The problem is that there are very few participants from Azerbaijan, although the company is registered there. This can be explained by the late implementation of e-banking and e-payment systems in the country. www.Auction.az

[44] 2005 e-Readiness Report, Economist Intelligence Unit
[45] According to the Azerbaijani Mission to the EU.
[46] “Azerbaijan in figures, 2005”, State Statistical Committee of Azerbaijan

also offered a wide variety of goods for sale, but operations have been frozen due to the lack of e-commerce infrastructure and resultant lack of demand. A number of other B2C sites are being developed.

According to the 2003 Country Profile produced by UNCTAD/WTO, chat, e-mail, games and search were the most popular online activities in Azerbaijan.

6.2 E-Government

On 12 August 2005, the new Law on Access to Public Information was ratified. This Law is key to the provision of more comprehensive government information through e-government solutions. The legislation places an obligation on government to provide interactive official websites, making all relevant and unrestricted information available to citizens.

Azerbaijan was ranked 78th out of 133 countries in 2001 with regards the implementation of e-Government according to a UNPAN E-Government-Global Survey.[47]

About 55 percent of Government Ministries and State Authorities currently have their own official websites.[48] All of these sites contain descriptions of their respective missions, general responsibilities and structures, information on working hours and duties of departments or directors. At the site of the Ministry of Taxes, citizens may ask questions and receive answers electronically.

The Government of Azerbaijan has a number of plans and proposals to expand the use of ICT in the State sector, particularly in such areas as information security and other database/registration systems. A State Programme on the Development of ICT in Azerbaijan has been created, with the aim of increasing the effectiveness of the use of ICT by State authorities, facilitating the interaction of the general population with these institutions and eliminating bureaucratic obstacles, as well as providing interoperability of information systems.

The joint Azerbaijan Government-UNDP Program, the National e-Governance Network Initiative, signed in June 2004, has been established in order to accelerate the training of Government officials, to provide transparency of state bodies, and to promote the building of the Information Society in Azerbaijan. The main goal of the programme is to create Government information portals and information access centres, which will be effective in facilitating interaction between citizens and Government systems in six regions of the country. Various elements of this programme are beginning to bear fruit, such as the rollout of the AzDATACOM network, which will allow regional government offices to establish VPN connections with central government, the tax registration portal and improvements to government websites.

A new, interactive, online tax system went online this year, allowing taxpayers to register their tax returns and make payments directly through their bank accounts. Progress has

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[47] The survey can be accessed here: http://www.unpan.org/e-government/globalleaderstables.htm.
[48] For more details on these websites see: http://www.gateway.az/eng/partners.shtml.

also been made, with the input of the UNDP, to improve the level of computerisation and automation of the national customs authorities.

6.3 E-Health

There are few, if any, significant e-health programmes in Azerbaijan. The UNDP-organised national IT awards for the country were not able to identify any e-health projects worthy of consideration.

A number of online health resources have begun to appear recently, such as http://doctor.aznet.org and http://www.mednet.az, although these are still quite basic.

6.4 E-Learning

On 28 October 2005, the Ministry of Education, with UNDP support, launched the "State Programme on provision of secondary and primary schools with information and communications technologies" (2005-2007). The Programme aims to support the computerisation of schools and to launch training courses for teachers in different regional (rayon) centres. The program aims to develop an overarching policy direction to support ICT in education, including computer literacy and Internet use. Ultimately, the Programme aims to provide one computer per 33 schoolchildren.

According to a statement of the Minister of Education, this programme is well on its way to achieving its targets. Up until the middle of 2006, all schools in capital and Absheron Peninsula had been equipped by up-to-date computer equipment and connected to the Internet. Due to increased financial and organisational support from the government, a more ambitious target of one computer per 27 schoolchildren has now been set.

Many central universities such as Baku State University, Azerbaijan Technical University, Azerbaijan Economical University, Azerbaijan Oil Academy, Khazar University (private) intensively use their own e-learning (distance learning) facilities.

A European Commission project on Creating e-Societies in the South Caucasus was launched in September 2005 and is due to last for two years. This includes a significant E-Learning component.

The Silk Project[49] has created a virtual information highway to integrate academic computer networks in each of the countries linked to it (Armenia, Azerbaijan, Georgia, Tajikistan, Turkmenistan, Kazakhstan Uzbekistan and, eventually, Afghanistan). It may also increase regional cooperation between Azeri research and educational centres. Within the framework of the Silk Project, it was hoped that satellite channel capacity would increase from 3 Mbps to 24 Mbps by the end of 2004. The most recent information suggests channel capacity is currently only 5 Mbps. Extended capacity will pave the way for further developments e.g. distance learning systems.

[49] http://www.silkproject.org/

Universities and colleges in Azerbaijan are involved in a wide range of international programmes, provided in the framework of the NATO science programme, the German Academic Exchange Programme (DAAD), TASCIS and TEMPUS (a higher education mobility scheme).

The AzNet programme, run by the Ministry of Education, AzRENA and the Open Society Institute, aims to give 50 percent of Baku, and 25 percent of other, secondary schools a 128kbps connection by the end of April 2007.

The national AzRENA[50] has its own dedicated satellite channel.

[50] http://www.azrena.org/

7 STRUCTURE OF THE COMMUNICATIONS INDUSTRY

It was decided on 10 August 2000 that the State would cede its shares in joint-stock enterprises and joint ventures. In so doing, the Government hoped to attract investment to improve the efficiency and competitiveness of these companies. The Ministry of Economic Development (MED) was authorised to offer enterprises for privatisation through specially designed individual projects and investment bids, envisaging that equal opportunity of investment would be made to foreign and local investors.

The chart below summarises the ownership and activities of the five fixed line operators and three GSM network operators in Azerbaijan.

Summary: Ownership structure and activities of main players in Azerbaijan

Name of Company	Operational Activity	Ownership Structure
Aztelekom[51]	Aztelekom is the dominant state telecoms carrier operating primarily outside Baku. It controls the overwhelming majority of fixed, fibre and significant number of satellite communications lines, and implements pricing policy for interconnection.	MCIT has 100 percent ownership.
Baktelekom[52]	Baktelekom is the second largest national telecoms service provider. It provides all kinds of telephone and radio communication services in the territory of Baku city. It also provides Internet access via Bakinter.net	MCIT has 100 percent ownership.
AzEuroTel[53]	AzEuroTel is the largest JV company and the only real competitor to Aztelekom, with a major fibre, satellite and fixed-line network. It provides a variety of telecommunication services: local telephone network, national and international communication, multipurpose trunking and satellite communication, and packet data transmission.	It is a UK-Azeri JV, which was founded in 1995 by the Azeri Ministry of Communication (Min Com) and LUKoil Europe Ltd (whose parent company is Russian). Both Min Com and LUKoil have 50 percent shares in the company.
CATEL (Caspian-Azerbaijan Telecom)[54]	CATEL is the operator of a fixed-line network and the first fixed wireless digital telephone network. Since February 2005, it is the third mobile operator in the 3G CDMA standard.	It is an US–Azeri JV, which was established in 1997 by Min Com and the US Consortium OMCL (Omni-Metromedia-Caspian Ltd.). The Azerbaijani and American companies have equal shares in the company.
Ultel[55]	Ultel is a fixed-line network, which provides services in Baku.	It is a Turkish-Azerbaijan JV, which was founded in 1991 by Min Com (51 percent share) and the Netash Turkish company (49

[51] http://www.aztelekom.org/

[52] http://baktelekom.bakinter.net/

[53] http://www.azeurotel.com/

[54] http://www.catel-az.com/

		percent).
Azercell[56]	Azercell is the biggest mobile company. It provides mobile services in all regions of country.	It is a Turkish-Azeri JV, which was established in December 1996 by Fintur Holdings BV (51.3 percent shares), Cenay Insaat (13 percent) and Min Com (31.7 percent).
Bakcell[57]	Bakcell is the second largest cellular communication company. It provides mobile services mostly in the capital and major cities.	It is an Israel–Azeri JV, which was founded in March 1994 by GTIB and Min Com. In December 2003, it was completely privatised.
Azersat LLC[58] Was renamed to Delta Telecom	Azersat LLC is the biggest satellite communication systems operator and Internet backbone provider.	It is an US-Azeri JV, which was established in July 2002 by Min Com (51 percent share) and Delta Telecom (49 percent).
Az.Starnet[59]	Az.Starnet provides network services based on broadband wireless communication.	It is an US-Azeri JV, which was founded in 2002 by the Arizona Daily Star and Min Com. Both companies have equal shareholding of 50 percent.
Baku & Boston TV	B&B TV provides cable communication services including television programming.	It is an US-Azeri JV, which was established in 1996 by Boston TV Communication (70 percent share) and Min Com (30 percent share).

Source: State Statistics Committee 2005

The state is a major player in this sector and it typically has a shareholding of at least 50 percent in Joint Venture companies. No official information is available with regard to the shareholdings of private citizens in Azerbaijani telecommunications companies, but it is not considered to be a significant amount.

7.1 Fixed Networks

As a result of the National Programme of State Property Privatisation, the Law of Privatisation was passed in January 2003, subsequent to two Presidential Decrees introduced on 22 and 29 March 2001, paving the way for the privatisation of state companies.

At present, the Government is preparing to privatise a number of telecoms companies. The calls for tender for the selection of financial consultants to facilitate the privatisation processes have already been completed by the MED.

Privatisation is expected to lead to general improvement in the telecoms system and to create a market for more advanced systems. Aztelekom,[60] having a monopoly on long-distance and international calls, including the leasing of intercity and international channels, was considered likely to attract foreign investors. However, little progress has been made with privatising it.

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55 http://www.ultel.az/
56 http://www.azercell.com/
57 http://www.bakcell.com/
58 http://www.azersat.az/
59 http://www.simsiz.net/eng/company.htm
60 http://www.aztelekom.net/index.php?lang=en

All companies operating in the telecoms sector were established as Joint Ventures (JV) with the former Ministry of Communications, currently the MCIT. In most cases, the MCIT holds majority shares (typically 51 percent). The management of the state-owned shares falls under the responsibility of the MED. In these Joint Ventures, the MCIT provides general support for the enterprise, while the other partner is expected to provide operating and investment capital and to be responsible for the overall operation of the company.

Although some international telecommunications companies are present in the Azerbaijan market through joint ventures, the fixed line sector is still mainly controlled by the two state-owned incumbents: Aztelekom and Baktelekom, both of which are controlled by MCIT.

Under the authority of the Aztelekom Production Union, there are 54 telecommunications enterprises such as the Baku Intercity Telephone Unit, and the Cable Technical and Repairs Unit.

BakTelekom is the monopoly provider of all telephone and radio communication services in the territory of the city of Baku. Baktelekom functions on the basis of self-financing principles.

In addition to the two state-owned operators, there are three Joint Venture fixed-line operators: AzEurotel,[61] Catel[62] and Ultel.[63] The most recent entrant to the market is AzTrank,[64] which provides services using the fixed CDMA standard. The market breakdown, according to the most recent information available from the MCIT (which dates from 2004) is as follows:

Aztelekom – 50.78 percent
Baktelekom – 42.3 percent
Ultel – 2.46 percent
Azeurotel – 2.1 percent
Catel – 1.57 percent

7.2 Mobile Networks

There are three main mobile communications companies in Azerbaijan. Bakcell,[65] the first mobile communication company in Azerbaijan, was established in March 1994 as a Joint Venture between an Israeli-based company, GTIB, and the then Ministry of Communications. Bakcell has now been privatised, with GTIB purchasing 51% of the shares in the company in December 2003. Bakcell has been running an aggressive campaign of investment and price reduction (up to over 80 percent in some cases) for the past year.

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[61] http://www.azeurotel.com

[62] http://www.catel-az.com

[63] http://www.ultel.az

[64] http://www.aztrank.az/index.php?l=en

[65] http://www.bakcell.com/eng/index.html

Azercell[66] was established in December 1996 as a Joint Venture between Fintur Holdings[67] and the then Ministry of Communications. There is an expectation that the state shareholding will eventually be sold, thereby putting the company 100 percent into private hands. However, no progress has yet been made in this area recently.

A third GSM operator, Azerphone, has been awarded a licence and was expected to launch services in September, 2006. The launch was subsequently postponed to the first quarter of 2007.

CATEL (Caspian American Telecom LLC) a Joint Venture between Azerbaijani and American entities, was established in 1997 by the Ministry of Communications of Azerbaijan with Omni-Metromedia Caspian Ltd. (OMCL). At the beginning of February 2005, CATEL introduced 3G CDMA mobile services in Baku, Sumgait and the Absheron Peninsula.

7.3 Cable Networks

There are few cable networks in Azerbaijan, the only one of note being B&B TV, which provides television and Internet services in Baku. The company is a joint venture between the MCIT and the American company EBI.

7.4 Internet Access Networks

There is very little ADSL on offer in Azerbaijan, with the vast majority of users connecting via dial-up. In the regions, Bakinternet[68] has a virtual monopoly, its identical pricing structure for urban and rural areas suggesting that it would be difficult for a competitor to address areas where set-up costs would be higher.

In recent years, AzTelekom has build up a domestic broadband infrastructure that has enabled it to bring services like IP telephony, ISDN, ATM and DSL within reach of many business and residential customers. Recently the MCIT finalised the roll-out of fibre-optic data connections between all telephone (PSTN) exchanges stations in the capital.

7.5 Satellite Operators

Satellite communication services are offered by the main satellite telecom service providers AzerSat LLC,[69] AzTelekom,[70] AzEuroTel[71] and Adanet.[72] Delta Telecom has

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[66] http://www.azercell.com/en/index.shtml

[67] http://www.finturholdings.com/html/

[68] http://www.bakinter.net/

[69] http://azersat.net/

[70] http://www.aztelekom.org/

also built a satellite-based network in Baku city. The majority of satellite communications users are from the corporate market, although some residential users also use satellite links to access the Internet.

Separate telecommunications services are offered to business users. For example, banks use satellite links to connect the ATM network with regional branches and Ministries use satellite links to communicate with regional departments. The State Customs Committee uses these services to synchronise databases.

Corporate satellite communication networks have been created for IBAR, Capital-Bank, State Customs Committee, the Ministry of Finance, the Ministry of Taxes as well as other smaller networks.

Through the ISBN Central Satellite Communication Station, in 2004, AzerSat LLC established corporate satellite communication networks for the National Bank of Azerbaijan, the Centre for Seismic Measurements of the National Academy of Sciences of Azerbaijan, and the Ministry of Internal Affairs. AzerSat also offers access to international services, in particular, broadcasts from the USA, Turkey, Germany, the United Kingdom, Italy and Russia are available. In Ganja, the second largest city in the Republic, an intercity “S-12” station has been installed.

VSAT services provide two-way Internet services, telephony, and, in the near future, television over IP. It is understood that DVB Broadcasting will also be available in the future. At present, television companies broadcast from separate satellites but are planning to move to a single satellite so that all home users can receive channels through a single satellite dish. Services are also available using TDM/TDMA and SCPC technologies.

ISPs use satellite services as backup to IP Backbone connections. ISPs also use a satellite-based network to provide Internet Services to regional Internet cafes and home users. In addition, three of the country's 14 ISPs use satellite connection provided by AzEuroTel,[73] the Joint Venture AdaNet[74] and AzCom[75] to access the Internet independently of any state satellite providers.

A satellite terminal 3 TxPx VSAT has been installed in the framework of the Virtual Silk Highway Project, known as the Silk Project. This is a NATO project that provides satellite-based networking to the academic communities of Central Asia and the Caucasus.

There is an expectation that actively harnessing the full potential of satellite and wireless telecommunications services will help independent operators compete with incumbent or monopoly internet service providers in Azerbaijan. Satellite services are intensively used in large scale state projects such as “Unique Custom Declaration Automatic Registration”, and the “Joint Notarial Registration System” where they have demonstrated overwhelming advantages over traditional, earthbound communications, and wireless networks for providing communications between central offices and remote branches located in isolated locations.

[71] http://www.azeurotel.com/
[72] http://www.scissors.az/index_e.html
[73] http://www.azeurotel.com
[74] http://www.azdata.net
[75] http://www.azcom.az/

The increased availability of satellite connections is believed to have had a positive impact on the market, helping push down prices:

- In 2002 the price per Mbps of a one-way Internet Backbone connection was approximately 36,000 US$ (29,800 Euro). In 2005, it was 3,900 US$ (3,200 Euro) per 2 Mbps of a two way IP Backbone connection;

- In 2000, the price of a 128Kbps VSAT service was US$900 (744 Euro). In 2005, it was 250 US$ (207 Euro) for a 256KBPS direct VSAT service;

- In 2000, a 2Mbps transmission service in Baku city cost approximately 340 US$(281 Euro) monthly and there was a 1,276 US$ (1055 Euro) sign up fee. Today, 100Mbps transmission costs 680 US$ (562 Euro) and there is no sign up fee.

The MCIT is promoting the wide usage of satellite technologies, together with Wi-Fi, as a low-cost alternative for remote rural communities lacking any incumbent telecommunications infrastructure. A problem relating to regulatory restrictions in this area is connected to the system of licensing and certification. In order to provide satellite services, it is necessary for companies to obtain a licence and certificate from the MCIT. The necessary procedure for this in somewhat confusing and new operators frequently find it difficult to obtain the official licences and certificates.

7.6 Production of IT Services

ICT development in Azerbaijan has long been driven by the requirements of its large oil industry. This has led to a legacy of low cost computer assembly in the country. Azerbaijan was one of only four countries that manufactured computers and computer chips for use throughout the former USSR.

The current market can be divided broadly into five sections:

1. Hardware and parts assembly

At least 16 large and medium sized companies produce computer hardware, making up 60 percent of hardware on the Azeri market. About 20 percent of the market is covered by international brand name units, whilst small producers produce the remaining 20 percent.

Among the most advanced and successful companies are Aztech Azerbaijan Technologies,[76] R.I.S.K.,[77] Azel,[78] Techno Services,[79] Top Az, Best Computers,

[76] http://www.aztech.az

[77] http://www.risk.az/

[78] http://www.azel.net/

[79] http://www.technoservice-az.com/

Computer Land, DNS Computer,[80] Unitech,[81] Marko,[82] Cen Group,[83] Ultra Computers,[84] Stream Technologies,[85] N-Link,[86] Smart Computers, and Computex.[87] Companies tend to import the components for assembly. Low cost, locally sourced computers provide an advantage for the development of the information society in Azerbaijan.

Major investment is underway to further increase computer production, including a major programme to increase the use of computers in schools.

2. Telecommunication and Radio Communications Equipment production

Some 27 companies, most of them SMEs, are engaged in assembling and manufacturing telecommunication and radio equipment. A skilled workforce and technological know-how exist for system integration services and the production of digital telephones and access devices, as well as satellite antennae, professional mobile radio stations, microwave stations, PCM multiplexers, satellite receiver equipment, terminal blocks and telemetric equipment for the oil sector, etc.

3. Software Application Development

There are more than 40 companies developing software applications, system integration and providing web-hosting and web-designing services. There are an estimated 27,500 software professionals working in this sector — 1,500 network engineers, 10,000 programmers, 1,000 systems analysts and designers, and 15,000 data entry operators.

4. Components and Sub-Assemblies

This sector is based on the manufacturing of semiconductors and electronic components for countries of the Soviet Union in the past, although it is now in decline. A notable development is that almost 50 percent of the computer market is served by local assemblers importing components from Asian sources to service demand in their domestic markets. As mentioned above, the development of engineering applications based on the expertise from the oil sector could be the cornerstone of significant growth of the software and electronic industry in Azerbaijan.

Major international companies such as Oracle, Microsoft, Intel and others have opened their regional (south Caucasus and Caspian basin) offices in Baku.

5. Consultancy and Systems Integration

A wide array of consultancy and systems integration services is available in Azerbaijan, from companies such as Azerbaijan Communications.[88]

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[80] http://www.dns.az/

[81] http://www.unitech.az/

[82] http://www.marco.az/

[83] http://www.centelecom.com/

[84] http://www.ultra.com.az/

[85] http://www.streamtech.net/

[86] http://www.nlink-az.com/

[87] http://www.computex.ws/

[88] http://www.azcom.az/

Azerbaijan: Market for ICT Products (Value Million US$/Euro)

Items		1998	1999	2000	2001	2002	2005
EDP Computer Hardware		30/25	28/23	32/26	38/31	40/33	60/50
	Servers	8/6.6	6/5	7/5.8	10/8.	10/8	15/12
	PCs & Workstations/Other add-ons	22/18	22/18	25/20	28/23	30/25	45/37
EDP Data Communication Hardware		6/5	5/4	5/4	7.5/6	8/6.6	10/8
	LAN Hardware	4/3.3	3/2.5	3/2.5	4.3/3.5	6/5	7/5.8
	Other data communication	2/1.6	2/1.6	2/1.6	3.3/2.7	2/1.6	3/2.5
Software & Services		4/3.3	3.5/2.9	6/5	7.5/6	10/8	50/41
	Software Products	2.5/2	2/1.6	3.5/2.9	4/3.3	5/4	20/16
	Software Services	1.5/1.2	1.5/1.2	2.5/2.0	3.5/2.9	5/4	30/24
Telecoms Equipment		65/53	61.5/51	60/50	58.5/48	50/41	200/165
	Public Network Equipment	40.5/33	38.5/32	38/30.4	36/29.8	20.5/17	150/124
	Public Network Equipment end user devices	24.5/20	23/19	22/18	22.5/18 .5	29.5/24	50/41
Office Equipment		11/9	10/8.2	12/9.9	11.5/9. 5	12/9.9	15/12.4
	Copiers	7/5.8	6.5/5.3	6.5/5.3	6.5/5.3	8/6.6	10/8.2
	Other Office Equipment	4/3.3	3.5/2.9	4.5	4/3.3	4/3.3	5/4
Semiconductors		2/1.6	2/1.6	2/1.6	1.5/1.2	1/0.8	---
Passive Components		2/1.6	2/1.6	2/1.6	1.5/1/2	1/0.8	---
Scientific Instruments & Control and Measurement Equipment		10/8.2	12/9.9	12/9.9	12.5/10	12/9.9	15/12.4
TOTAL		**130/107**	**124/102**	**131/ 108**	**138.5/ 114.46**	**200/ 165**	**350/ 289**

Source: ITC project file / European Information Technology Observatory

7.7 Financial Development of the ICT Sector

The State Statistical Committee of Azerbaijan provides a useful level of figures regarding the development of the ICT sector in the country.

The following is a breakdown of revenues (in US$/Euro) from public communication services for 1995-2005. Local call and line revenue is not included in the table below

Breakdown of revenues (in thousands US$ / Euro) from public communication services for 1995-2005.

	1995	2000	2001	2002	2003	2004	2005
Total revenue in thousands from all communication services	25,460/ 21,041	160,370 / 132,537	178,034 / 147,135	208,533 / 172,341	256,547 / 212,022	337,205 / 278,681	523,992 / 433,113
Intercity/internationa l calls percent of total	21,571/ 17,827 84.7 percen t	68,370/ 56479 42.6 percent	68,056/ 56,244 38.2 percent	71,392 / 59,001 34.23 percent	82,128/ 67,874 32 percent	94,485 78,086 28 percent	123,606 / 102,154 / 23.6 percent
Mobile communication		73,859/ 60,379 46	90,328/ 74,651 50.7	111,131 / 91,843	146,977 / 121,468	216,991 / 179,331	335,815 / 277,533

percent of total		percent	percent	53.3 percent	57.3 percent	64.4 percent	/ 64.1 percent
Internet percent of total		1,668/ 1,378 1 percent	1,779 1,470 0.99 percent	2,612 2,158 1.25 percent	3,270/ 2,702 1.27 percent	3,905/ 3,227 1.16 percent	9,798/ 8,098/ 1.9 percent

Source: State Statistical Committee 2005-06-18 [89]

The table below outlines the approximate size of the total long distance and international calls markets in Azerbaijan.

Total (US$/Euro) of the long distance and international calls markets in Azerbaijan

Incomes	1995	2000	2001	2002	2003	2004	2005
Total from all services (10^3)	25,460 21,041	160,370 132,537	178,034 147,135	208,533 172,341	256,547 212,022	337,205 276,681	523,992/ 433,113
From long distance & international calls	21,571 17,827	68,370 56,975	68,056 56,244	71,393 59,002	82,128 67,874	94,485 78,086	123,606/ 102,154/ 23.6 percent

Source: State Statistics Committee 2005

A table setting out the growth in value of the Azerbaijani ICT market can be seen about (in the section on IT Products and Services). Statistics announced by the Ministry of Communications and Information Technologies stated that the total revenue of the communications market in the first half of 2006 was 250.1 million AZN or 223.55 million Euro, an increase of 27.1% on the same period in 2005. 29.3% of this income went to state-owned enterprises, while the remainder went to private companies.

[89] ‘Communication of Azerbaijan’ Statistical Yearbook (for 2005)