

.ir

Iran

Masoud Davarinejad and Massood Saffari

Technology infrastructure

From 2000 until the end of 2005, Iran witnessed large increases in infrastructure capacity and development of information technology. Privatization and competition in the telecommunications market were the main themes of the Third Five-Year Plan 2000–2004. Although the infrastructure was off limits to private investment and competition due to restrictions imposed by Article 44 of the Constitution, major investment attractions such as the second nationwide mobile license were auctioned, and service provision in data communications, the Internet and satellite communications was opened to the private and public sectors.

Official statistics at the end of 2005 show a remarkable increase in telecommunications growth indicators. One of the main contributing factors was the implementation of guidelines in the Third National Development Plan to downsize and thus improve the efficiency of government organizations and companies. This hazardous and bumpy yet life-saving path resulted in record achievements. There are 1.48 employees for maintenance of fixed telephony per 1,000 lines compared to 4.99 per 1,000 lines at the end of 1999. The number of fixed-line subscribers jumped to 20.34 million with a penetration rate of 29.7, and the number of mobile telephone subscribers went up to 8.51 million in 990 cites or almost 100 per cent nationwide. By July 2006, there were 21 million fixed-line subscribers and 10 million mobile phone subscribers.

Parallel efforts to increase digital switches and fixed-lines in urban areas provided one million transmission circuits at the end of 2005. This was due to the increase in the number

Population (October 2006 census)	70,490,262 (urban 69.9 per cent; rural 30.1 per cent)
GDP	USD 187.9 billion (current prices), USD 2,730 per capita
Key economic sectors (per cent of GDP)	Petroleum & Gas (27 per cent), Agriculture (10 per cent), Industry (16 per cent), Services (47 per cent)
Computers per 100 inhabitants	7.5
Fixed-line telephones per 100 inhabitants	29.7 (20.34 million lines)
Mobile phones per 100 inhabitants	12.5 (8.51 million subscribers)
Internet users per 100 inhabitants	12 per 100 inhabitants (8.25 million subscribers)
Domain names (.ir) registered	46,442 as of December 2006
Broadband subscribers per 100 inhabitants	0.38 (260,000 subscribers)
Internet domestic bandwidth	10,075 Mbps
Internet international bandwidth	3,720 Mbps as of December 2006

Note: All figures are as of 22 March 2006 unless otherwise stated.

of microwave stations and the upgrade of legacy transmission facilities utilizing digital radio links.

The use of fibre optics in the telecommunications backbone is fairly recent. Official figures provided by the Telecommunications Company of Iran (TCI) show that there was no fibre optic network in 1995, nearly 7,200 km of fibre optic network at the end of 1999 and 56,000 km in 2005. TCI reports that to minimize downtimes and boost the availability of the network, the whole network is designed as three interconnected DWDM loops with a capacity of 4 STM 64 and routes ending in Tehran with 8 STM 64.

The deployment of fibre optics in other infrastructure sectors has also gained momentum. The Iran Power Generation, Transmission & Distribution Management Company, known as TAVANIR, has reported the implementation of Optical Ground Wire (OPGW) and Power Line Communications (PLC) to 2,500 km, with plans to extend to 6,500 km. This network is intended mainly to connect the five dispatch centres scattered throughout the country and to trade the excess capacity with TCI for voice channels or other services. Iran Railways also benefits from a network consisting of coaxial cable and fibre optics for its signalling and messaging needs. The network is 2,500 km long.

Telecommunications facilities available till the latter half of the Third National Development Plan included High bit-rate Digital Subscriber Line (HDSL) links using leased lines and base band modems and spread spectrum wireless links which had gained popularity due to the fact that no license or payment of fees was required. At the same time, the Data Communication Company of Iran (DCI), which was established in 1991, finally

gained momentum by providing high-speed HDSL links and E1 and fractional E1 connectivity to cope with the growing demand for data communications facilities. At the end of 2005, DCI, which was renamed the IT Company after the reorganization of the Ministry of PTT (MPTT) and TCI in 2004, reported a total of 106,104 high-speed ports.

Since 1969 satellite communication has been dedicated to providing international voice connection. The first trial to enable 300 rural areas to access the telephony system via satellite failed due to technical difficulties and design flaws. In 1988, attempts to provide data communications using VSAT terminals succeeded and TCI established its first hub in Bumehen, a city 20 km east of Tehran. In 2002, TCI had more than 900 VSATs installed. In the same period, the Central Bank of Iran was issued a license to provide satellite access solely to the banks and for banking applications only. By the end of 2004, they had more than 2,500 terminals installed and a plan to deploy another 1,500 within two years. In 2005, the Communication Regulatory Organization opened VSAT and satellite services to competition and issued four five-year licenses.

Between 2003 and 2005, in accordance with regulations set by the Supreme Council of Information Dissemination (HCID), MPTT issued to the private sector, hundreds of permits to provide Internet services and a few permits to provide gateway services to the Internet (known as ICP). Those providing the connectivity to the international gateways installed their own satellite facilities and acted in accordance with mutual contracts with their partners, mainly from Europe. Official reports indicate that there were 747 ISPs and 35 ICPs at the end of 2005 in Iran.

Among several regulated services opened for licensing to the private sector were data communications service provider licenses (known as PAP in the local market) which permit licensees to provide wired/wireless data communications services throughout the country. By the end of 2004, out of 26 applicants only 11 remained in the market, providing ADSL, G.HSDHL and high-speed wireless services to around 200,000 subscribers in more than 40 cities. Competition has reduced the price of Internet access to a monthly payment of USD 16 for a minimum package of 64/128 Kbps, including an ADSL modem or CPE (Customer Premises Equipment).

Increased use of the Internet bandwidth is partly due to international calls. Although there was no specific regulation for Voice over Internet Protocol (VoIP) in 1999, there was tacit approval among the middle management of the MPTT and DCI of VoIP for calls originating from Iran while terminating calls would not be permitted. By 2005, the increase in the number of minutes for terminating calls had reached about 600 million minutes or 57 per cent of the total incoming traffic to Iran. This forced MPTT to regulate the situation and finally issue

temporary (renewable annually) permits for international calls originating from the country and to declare terminating calls as illegal. This in turn has created a grey market for what has been nicknamed ‘smugglers of minutes’. These unwanted small entities use unlicensed satellite equipment to connect to their minute providers abroad using Internet protocols and dedicated routers. They are known to have made fortunes. In May 2005, the Communication Regulatory Commission (CRO) produced a comprehensive model named ‘international voice services’ to regulate the volatile market covering both origination and termination as well as transit calls, and a draft license was prepared for the regulatory commission to approve, which is still pending.

There is lack of agreement about the number of Internet users in Iran. Sanaray, the Software Export Research & Development Co., notes the number of Internet users as of December 2005 to be 7.35 million: 4.04 million (55 per cent) home use, 1.91 million (26 per cent) government use and 1.4 million (19 per cent) business use. Internet World Stats reported on 12 August 2006 the number of Internet users in Iran in mid-2005 to be around 7.5 million. Other sources, such as IT newsletters and blogs, estimate the number of Internet users in Iran to be between 5 and 15 million as of end 2005 to mid-2006. A report circulated by the Office of the Minister of CIT in August 2005 probably presents the most accurate estimate: 8.25 million with a penetration rate of 12 users per 100 inhabitants. One reason for the differences in reported numbers is the difference in definitions of Internet users: some do not count the mere use of e-mail, while others think including those who access the Internet at Internet cafés is double-counting. However, most studies agree that there are 2.5 million dial-up Internet subscribers in 316 cities (or 31.6 per cent of the 990 cities in the country).

Key institutions dealing with ICTs

Policymaking in information technology is multifaceted and requires coordination among several sectors that have different agendas and priorities. In Iran, the issue is compromised by concurrent councils and bodies each addressing a division within IT. These include the Ministry of Communications and Information Technology (MCIT), the High Council of Informatics (HCI) which is affiliated with the Management and Planning Organization (MPO), the Supreme Council of IT within MCIT which is headed by the President, and the High Council of Information Dissemination (HCID) which is affiliated with the High Council of the Cultural Revolution. In addition to these official bodies, the High Council of Cyberspace Information Exchange Security (AFTA), which is under the Office of the President, has published general guidelines for ICT security.

HCI, composed of representatives of several key ministries and organizations, was the first body empowered by the Supreme Council of the Revolution in 1979 to make decisions on computer-related issues. During its first years of operation, HCI managed and settled claims and disputes between large international computer companies. It was not until 1990 that HCI played an active role in policymaking and guidance of the IT sector.

The Secretariat of HCI, the executive body that carries out the decisions of the HCI within the Planning and Budget Organization which was later renamed the Management and Planning Organization (MPO), was reconstituted and took the lead in developing the IT sector in Iran and in responding to the needs of the commercial market and the researchers by providing them with information and analysis of applied technologies, IT indicators and statistics, and insights into the need to implement professional standards. This laid the foundation for an era of interaction among key players.

In the years 2000–2002, when the High Council of Information Dissemination (HCID) and the Development of Information Technology Applications programme (TAKFA) began to take over policymaking in the IT sector, HCI's influence and policymaking role gradually faded away although its legal foundations and official status and duties remained unchanged.

HCID was established in 1998 as the main authority and policymaker in IT and Internet-related issues in Iran, in response to concerns expressed by the cultural authorities and influential religious figures regarding the presentation of explicit content over the new media, in particular the Internet. Its first move was to announce in 2001 the regulation of operations of the ISPs and the ICPs. An executive body was established to ensure that materials on the Internet did not undermine or violate accepted social norms of decency and modesty and national security. This body has been the object of much criticism from both its foes and friends.

Although the approach and rules set by HCID had a limiting impact on the growth of the Internet as intended at the outset, the efforts of educational institutes, research centres and universities, and the pioneer vanguard Internet service providers spurred the growth and spread of the Internet, which in turn resulted in an increase in the number of ISPs and ICPs. This made the Internet accessible around the country.

In 2003, a law stipulating the duties and powers of the MCIT was passed and a new council to govern IT in Iran was born. However, this did not eliminate the outdated, ineffective and redundant bodies and councils. The new Supreme Council of Information Technology (SCIT), chaired by the president and

managed by the Minister of CIT, took over all aspects of IT policymaking but oversight of digital contents remained within the responsibility of the Supreme Council of Dissemination.

There is one regulatory body governing ICT development in Iran: the Communications Regulatory Commission (CRC) headed by the Minister of CIT and its executive body, the Communications Regulatory Organization (CRO). The CRC consists of government-appointed experts and senior officials of MCIT and other government bodies. It approves the rules and regulations for the development of the ICT sector. The CRO implements the rules and regulations approved by the CRC and is responsible for radio frequency management and planning. It has offices all over the country.

The institutions responsible for supporting and promoting ICT-related initiatives are the Hi-Tech Industries Center under the Ministry of Mines & Industries, the Electronics Fund for Research & Development (ESFRD) also under the Ministry of Mines & Industries, the Development of Information Technology Applications programme (TAKFA) and the Production and Management of Electronic Content initiative (TASMA) started by HCID in early 2006 to complement TAKFA. TAKFA, an initiative in 2001–04, was part of the National ICT Agenda of the President's special envoy in close collaboration with the secretariat of HCID.

ICT research is centred mainly in the Iran Telecommunications Research Center (ITRC), which is affiliated with MCIT, the Institute for Studies in Theoretical Physics & Mathematics (IPM), the Sharif Advanced Information and Communications Research Center and the Research Center of Informatics Industries.

Several NGOs have been active in ICT development in Iran for more than two decades. However, due to tight government control of the sector, they do not have a serious role in ICT development in the country. These NGOs include the Computer Guild Organization, Iran Informatics Companies Association, Sanaray Software Export Research & Development Co., Informatics Society of Iran, Computer Society of Iran and Union of Iranian Software Exporters.

Several legacy government organizations mandated to produce information and statistics and established before 1977, such as the Statistical Center of Iran, the National Cartographic Center and the National Remote Sensing Center, have been major users of large mainframe computers and are believed to be among the major contributors of digital data for the growth of other sectors and national planning. Also among such organizations are the Information Technology Company (ITC) affiliated with MCIT and the Iranian Information & Documentation Center (IRANDOC).

Digital content

Websites in the Persian language form part of non-Latin based digital content on the Internet. The number of Persian blogs is estimated to be around 800,000, of which one-eighth are registered with service providers like Persian Blog and Blogfa (Ziyae-Parvar 2006). Other sources report the number of active blogs to be around 150,000. There is also a considerable volume of Persian content on Islamic-related issues available on the Internet. A large array of CD-ROMs on Islam and Iranian culture, basic education and history is likewise available in the market.

The DPI Law system, an online Web-based Persian search engine and data base established in 1999, has about 10 Gb of text and indexes that include all of the legislation, enacted laws, bylaws, government and ministerial decrees, important court rulings and regulations with cross-links, as well as references to obsolete, ineffective and amended paragraphs. However, because legal expertise is required for the evaluation of remarks and pronouncements, and because of lack of financial support, the website's operation and services have been reduced to a minimum since early 2006.

Tebyan, which is affiliated with the Islamic Development Organization, runs a website covering religion and related sciences and issues. It is expected to roll out the largest data centre in Iran by mid-2007.

TASMA, an acronym for 'Production and Management of Electronic Content' in Persian, was announced by HCID in 2006 as a substitute for the TAKFA programme in the promotion of digital content in Iran. This programme is part of a restructuring plan that led HCID to focus exclusively on Persian content and leave other IT-related issues to the Supreme Council of IT.

Use of the Persian language in computer applications, specifically typefaces on printers, keyboards and data entry systems, goes back to 1975 when IBM introduced Persian printing chains and slugs and banking applications used NCR Persian keyboards to generate bank statements and monthly reports in Persian. Through the joint efforts of SHCI and Sharif University of Technology, the Persian language is now a part of Unicode and portability of Persian data from any platform is assured.

Online services

Basic online services, such as downloading of forms to be filled in, signed and then mailed back to processing authorities, have been available to the public in Iran since 2000. However, it was not until 2003 that these basic online services were recognized and utilized by the few with access to the Internet. The lack of payment capability in these online services gravely limited

their scope. In early 2003, very few websites offered electronic marketing. Only local cash or debit cards were accepted, as credit cards were not yet available. In the beginning, only locally available products, for which shipment was not an issue, were marketed, such as scarves, handicrafts and flower bouquets for feasts and funerals. Goleshahr was one of the few that pioneered in online sales in Iran; it has left the market to hundreds of newcomers.

The root Certificate Authority (CA) is now in place in Iran. Although many B2C websites are in service, shopping online is not yet popular. B2B services have not yet been developed.

Another online service is the publication of university entrance examination results. Millions log in to websites designed for this purpose, such as the Sanjesh Organization website. The period when examination results are published is characterized by the worst Internet traffic in Iran.

Most banks offer basic online services over the Internet, such as online statements of account. These services are also offered using fax and SMS. In some banks, individuals can now transfer funds between their accounts within a bank. The interbank network called SHETAB, which is affiliated with the Central Bank, provides connectivity and switching services for all of the 16 banks and credit institutes in Iran. SHETAB has gained momentum in the last two years, despite public dissatisfaction with the pricing scheme and its monopoly status. The Central Bank reports 18.542 million electronic cards issued as of September 2006, representing a 78 per cent increase from the end of 2005. The number of automated teller machines has grown 56 per cent in the same period to 7,630 nationwide. There were 115,537 point-of-sale terminals in use as of September 2006, a 210 per cent increase from the end of 2005 (Central Bank Payment Systems Bureau September 2006). Online payment of utility bills has gained popularity and account holders now require more sophisticated services from their banks. These services are being organized and advocated by the card companies associated with the banks. One factor in the late introduction of these services is said to be the incompetence of the IT bureaus of the utility companies.

The railways authority is among the few government agencies in Iran with IT plans and successful implementation of online services. Its Web-based services include presentation of detailed train schedules, reservation and sale of tickets.

Online reservation and sales of theatre tickets, CDs and DVDs, household appliances, and second-hand and used items sold by electronic thrift shops, as well as online student registration are becoming popular. However, no statistics on these services are available as of now.

ICT and ICT-related industries

Production of analog telephone switching centres in Iran goes back to 1969 when the Iran Telecommunications Manufacturing Company (ITMC) was founded in the city of Shiraz to produce switches for local, STD and transit switching centres for the telecommunications backbone. To guarantee the flow of technology and know-how, the German Siemens company was given 40 per cent of the shares of ITMC, and the MPTT and Bank of Industry and Mines a 30 per cent stake each. ITMC's nominal production capacity for analog switches was 30,000 subscriber lines. In 1990, a new production line for manufacturing digital switches was installed and production reached 260,000 subscriber lines. Later in 2003, as reported by TCI, production reached 2.5 million subscriber lines. ITMC has 70 per cent of the local market for fixed telephony switches.

In addition, there are private companies manufacturing digital telephone switches and pertinent software for small-capacity switching centres and PABX with less than 10,000 subscriber lines. Although there is a market for small switching centres below 10,000 subscribers in small cities and rural and industrial areas, these companies are unable to envision exporting their goods and they are always threatened by the active presence of major manufacturers. Thus, they are always seeking government protection to limit the import of telephones and other telecommunications equipment into the country.

Production of fibre optic cables started in 1994 in the city of Yazd with a capacity of 30,000 km of standard cable of different capacities.

The Syndicate of Telecommunications Industries has reported a membership of 50 major companies manufacturing antenna, telephone sets, small PBX, UHF/VHF radios and wireless handhelds, multiplexers, GSM BTS and antenna, copper cables and wires. The Iran IT Manufacturers Syndicate (IITMS), another strong union, has 52 members producing CRT and LCD monitors, power supplies and UPS, keyboards and other common computer peripherals such as mouse and speakers, PCs in CKD, simple SMD boards and computer accessories. Except for less than USD 10 million worth of exports, most target the Iranian market and lack competitive export capabilities.

Enabling policies and programmes

The Third National Five-Year Development Plan 2000–2004 was a landmark move for the privatization and liberalization of the telecommunications sector in Iran. Eleven licenses were granted to data communications service providers known as PAP, through which they provide ADSL and cellular wireless

technologies; five licenses were issued to satellite service operators; six licenses were given to PSTN operators; and two licenses were issued to GSM mobile operators.

In July 2002, the government launched TAKFA (Development of Information Technology Applications programme, an acronym in Persian), which had seven major axes:

1. e-government;
2. education and digital skills development;
3. higher education, health, and medical therapy and training;
4. social services;
5. commerce and trade;
6. culture, arts, and Persian language and script in computer environments; and
7. ICT industry through SME empowerment, incubation centres and technology parks.

TAKFA encouraged major government agencies to review their existing plans and incorporate these seven initiatives. Agencies with plans that were fully in line with TAKFA's thrusts were granted a generous budget or subsidized finances. TAKFA initiated 110 major projects consisting of more than 5,000 sub-projects in almost all sectors. TAKFA also initiated several by-laws and decrees issued by the MPO and the President to minimize government spending and improve bureaucratic efficiency. However, TAKFA failed to produce a cohesive roadmap for sustainable growth of IT in Iran. A second phase for TAKFA is now under study.

The Fourth National Five-Year Development Plan 2005–09 envisions a knowledge-based economy in which the ICT sector, technology parks and incubators are to play a key role. Technology parks are exempted from state and local taxes and given other incentives to attract investors. The Plan highlights the following thrusts:

1. Systematic expansion of ICT applications towards the realization of a knowledge-based economy consistent with national development goals;
2. Development of human resources as a strategic priority in the expansion of ICT applications in order to create more 'value-creating' jobs;
3. Cultural development and creation of an empowering environment for creating maximum national synergy;
4. Implementing the necessary infrastructure for ICT development, including access network, security, laws and regulations, resources and facilities; and
5. Development of facilities and opportunities towards mobilization of the private sector.

Technology parks and incubator centres have been the centre of government attention since 1998 and their growth was considerable during the period of the Third Plan. There are now nine incubators authorized by the Ministry of Science and Technology. Pardis Technology Park (PTP), a major project, is located 20 km east of the capital city of Tehran, with an area of 38 hectares. The Park enjoys proximity to one of the largest telecommunications facilities in Iran, with major local and international fibre cables passing through it. PTP, which was started in 2001 as a government initiative, aims to create an environment for companies with similar missions to develop high-tech industries and to facilitate the flow of foreign investment and the transfer of technologies to its tenants. The full rollout has been rescheduled to early 2007. Out of 70 companies committed to joining PTP, 42 are in IT and telecommunications; the rest are engaged in automation, biotechnology, mechanics and chemistry. One of the major data centres in Iran is under construction at PTP. The techno-market, first conceptualized by PTP in Iran, aims to harbour a cyber market for the trading of know-how, innovative ideas and products. Having started off by building physical capacity, PTP has recently diverted attention to strategic planning and devising a clear business plan and a legal and financial framework.

Legal and regulatory environment

As previously mentioned, the Communications Regulatory Commission (CRC), consisting of seven members and headed by the Minister of MCIT and with the president of the Communications Regulatory Organization (CRO) as secretary, is empowered to restructure the telecommunications sector and to approve telecommunications regulations and by-laws. The CRO implements the policies and decisions of the CRC, issues licenses for telecommunication services, and allocates and manages the frequency spectrum. CRO is built on the former Directorate-General for Radio Communication, a major bureau within MPTT and the ITU contact point.

Unfortunately, due to ambiguities in interpretations of the Constitution, arbitration is not covered by existing laws and is a matter of voluntary engagement. Arbitration plays an important role in forming and guiding the telecommunications market.

Some of the important issues perceived to have a major impact on the growth of the software market have been addressed by the relevant councils. Copyright law, which has been in effect in Iran since 1990, is the most important in this regard. However, Iran has not yet joined any international agreements on copyright of foreign software, except for bilateral treaties in which a mutual copyright is also respected.

Tehran Software and IT Park

The Tehran Software and IT Park (TSITP) started out as an idea of the Tehran Municipality to capitalize on its 435 m tall telecommunications tower (called Milad Tower) and the surrounding 8 hectare (expandable to 15 hectares) park and forest. The MPTT, on the other hand, envisioned TSITP as a prestigious IT park with an attractive and flexible franchise to support the development of innovative and technology-driven enterprises. The Minister of PTT and the Mayor of Tehran signed a partnership agreement in January 2002, a five-member steering committee was appointed, and the study phase commenced on October 2002, with a budget and financial resources allocation by ITRC. The study recommended skipping over the Milad premises for a larger and more appropriate location.

TSITP was intended to upgrade Iran's access to technology, facilitate Iran's integration into the global economy, create a world-class environment that would attract innovative elites, pave the way for blending with the global wave of information technology, and prepare the ground for interaction between the local and world markets. As part of the consensus-building around TSITP's mission, a lot of effort was devoted to reaching a collective understanding of the country's current status and future directions for development. A pilot project, in the form of an elaborate IT tower in Tehran, was conceived to answer the short-term goals of TSITP and to provide the experience needed for the main project. In August 2004, concluding an international bid on the Internet, the main contract for the basic design and international promotion was granted to an experienced consultant from Ireland.

However, changes in the management of ITRC and the TSITP steering committee, changes in MCIT policies in mid-2003, and the change in government in July 2005 had an adverse impact on the project. In spite of the professional planning and strong inception of the project and its well-defined and documented outputs, the TSITP project has been practically shut down since mid-2004. The latest assessment indicates a grim future for the TSITP project.

The e-Commerce Law (also known as the digital signature law) was passed in 2004. However, due to lack of pertinent by-laws and decrees, the law has not yet become effective enough to govern e-commerce transactions in the country.

The Computer Crimes Act passed the preliminary approval process in the Parliament in September 2006, and its details are now being thrashed out by a special parliamentary committee. This act is in compliance with the Cyber Crimes Convention approved by the European Council in Budapest in 2001.

Education and capacity building

IT and computer engineering programmes are widely offered in Iranian universities and higher education institutes. Majority (68 per cent) of the students are enrolled in the bachelor's programmes, 28 per cent are enrolled in the post-diploma courses, and 4 per cent are enrolled in the Master's courses. The number of graduates in fields related to ICT is estimated to be more than 50,000 a year, while the annual intake of new students is more than 12,000.

Almost all of the universities and other higher education centres are connected to the Internet. Indeed, the universities were among the first in Iran to be connected to the Internet via the IPM facilities in 1995.

Computer courses have been part of the secondary school curriculum for many years now. More than 150,000 students take computer courses in different high school grades annually. There are also plans to connect up to 1,000 high schools to the Internet by mid-2007.

Following TAKFA guidelines, obtaining an ICDL certificate is now part of the qualification requirements for new government recruits and for promotion in the civil service. Many training institutes throughout the country provide ICDL training.

At present, there are few online schools and universities and distance learning centres. However, their number is expected to grow considerably.

Research and development

There are many small and medium-sized research and development institutes dealing with ICT in Iran. Those with a substantial impact on ICT development include: the Iran Telecommunications Research Center (ITRC) affiliated with MCIT, the Electronics Support Fund for Research & Development (ESFRD) affiliated with the Ministry of Mines & Industries, the Hi-Tech Industries Center also affiliated with the Ministry of Mines & Industries, the Sharif Advanced Information and

Communications Research Center and the Research Center of Informatics Industries.

ITRC was established in 1970 by the University of Tehran and the Government of Japan (NTT). In 1979, the Revolutionary Council decided that for the sake of self-sufficiency the Center would be affiliated with MPTT. ITRC is the largest ICT research institute in Iran. Its projects include design and development of digital radios, transmission networks, antennae, satellite communications, cellular networks, fibre optics and laser switching and, more recently, ICT strategic planning and telecommunications consultancy services. One of ITRC's greatest contributions to ICT capacity building are many non-government communication companies that started out as ITRC research groups. However, in recent years ITRC's work has been criticized as lacking in direction and there is an ongoing debate regarding its mission and framework.

The ESFRD is a fund dedicated to supporting R&D in ICT and other fields in electronics. It was established in 1997–98 with a total paid-in capital of USD 30 million. Its goals are to promote entrepreneurship, software development, engineering services, international collaboration and export. ESFRD helps non-government ICT projects by means of inexpensive loans, guarantees and underwriting, information services and soon through venture capital investment.

With respect to open source software development, the High Council of Informatics in conjunction with TAKFA and the Sharif Advanced Information and Communications Research Center supported the development of the Persian Linux platform launched in early 2006.

Challenges

TAKFA was probably the most highly publicized IT project in Iran in the past decade. It succeeded in making ICT an important agenda for the President and influenced major government bodies to spend on ICT. TAKFA spurred government authorities and a frail private sector to respond to the challenge of sustained growth in information technology with a comprehensive plan. However, experts have pointed out that lack of consistent strategies, cohesive plans and experienced consultants has doomed TAKFA's efforts.

Indeed, in July 2005 a new government was sworn in and IT is not in its new set of priorities. Some in the IT sector believe that the privatization and liberalization of the economy will not be sustained and a more government-centric development will emerge. Iran's telecommunications market has a very promising future, due mainly to the size of the population and the current penetration rate of mobile telephony and other

telecommunications services. The growth of the national IP network backbone is also a contributing factor. However, recent upheavals and the partial reversal of privatization policies, as seen in the case of the second mobile operator, do not bode well for the continued growth of the telecommunications sector in Iran.

References

- BBC Persian. Available at <http://www.bbc.co.uk/persian/iran/>
- Blogfa. Available at <http://www.blogfa.com>
- Communication Regulatory Authority (CRA)/ Communication Regulatory Organization (CRO) Homepage. Available at <http://www.cra.ir/Main.asp>
- Computer Guild Organization Homepage. Available at <http://www.irannsr.org/>
- Computer Society of Iran (CSI) Homepage. Available at <http://www.csi.org.ir/index.asp>
- DPI Law System. Available at <http://www.iranlaw.ir>
- Electronics Support Fund for Research & Development (ESFRD) Homepage. Available at <http://www.esfrd.ir/>
- High Council of Cyberspace Information Exchange Security (AFTA) Homepage. Available at <http://www.afta.ir/>
- High Council of Informatics (HCI) Homepage. Available at <http://www.shci.ir/>
- Hi-Tech Industries Center Homepage. Available at <http://www.hitech.ir/>
- Informatics Society of Iran (ISI). Available at <http://www.isi.org.ir/index.asp>
- Information Technology Company of Iran (ITC) Homepage. Available at <http://www.itc.ir/english/index.asp>
- Institute for Studies in Theoretical Physics & Mathematics (IPM) Homepage. Available at <http://www.ipm.ac.ir/IPM/homepage/homepage.html>
- Iran Informatic Companies Association (IRICA) Homepage. Available at <http://www.irica.com/portal.aspx>
- Iran Power Generation, Transmission & Distribution Company (Tavanir) Homepage. Available at <http://www.tavanir.org.ir>
- Iran Railway Co. Homepage. Available at <http://www.rai.ir/site.aspx>
- Iran Telecommunication Research Company (ITRC) Homepage. Available at <http://www.itrc.ac.ir/eng111.php>
- Iranian Information & Documentation Center (IRANDOC) Homepage. Available at <http://www.irandoc.ac.ir/english/default.htm>
- Islamic Development Organization Homepage. Available at <http://www.ido.ir/>
- ISNA News Agency. (2006). (news article in Persian). Retrieved from <http://isna.ir/Main/NewsView.aspx?ID=News-791595>
- ITIRAN Online Magazine. (news article in Persian). Retrieved from <http://www.itiran.com/?type=news&id=6257>
- ITIRAN Online Magazine. (news article in Persian). Retrieved from <http://www.itiran.net/archives/002118.php>
- ITNA Online Magazine. Available at <http://www.itna.ir/archives/news/001038.php>
- Mihan Blog. Available at <http://itmanagement.mihanblog.com/Post-263-ASPX>
- Ministry of Communication and Information Technology (MCIT) Homepage. Available at <http://www.ict.gov.ir/>
- Ministry of Science and Technology (MSRT) Homepage. Available at <http://www.msrt.gov.ir/sql/asp/park.asp>
- National Cartographic Center (NCC) Homepage. Available at <http://www.ncc.org.ir>
- National Technomarket of Iran Homepage. Available at <http://www.techmart.ir/en/>
- Online Public Relation Blog. Retrieved from <http://weblog.eprsoft.com/archives/005276.html>
- Pardis Technology Park (PTP) Homepage. Available at <http://www.techpark.ir/>
- Persian Blog. Available at <http://www.persianblog.com/>
- Research Center of Informatics Industries (RCII) Homepage. Available at <http://rcii-ir.org/WebGenerator/PageViewEn.aspx?src=1>
- Sanaray Co. Homepage. Available at <http://www.sanaray.com/english/Site.aspx>
- Sanjesh Organization Homepage. Available at <http://www.sanjesh.org/>
- Sharif Advanced Information and Communications Research Center Homepage. Available at <http://www.aictc.com/>
- Sharif University of Technology Homepage. Available at <http://www.sharif.ir/en/>
- Statistical Center of Iran (SCI) Homepage. Available at http://www.sci.org.ir/portal/faces/public/sci_en
- Syndicate of Telecommunications Industries Homepage. Available at <http://www.irtelesyndicate.com/>
- Tebyan Homepage. Available at <http://www.tebyan.com/>
- Telecommunication Company of Iran (TCI) Homepage. Available at <http://www.irantelecom.ir/eng.asp>
- Telecommunication Infrastructure Company of Iran (TIC) Homepage. Available at <http://www.tic.ir>
- Union of Iranian Software Exporters Homepage. Available at <http://www.uiseonline.org/>
- Ziyae-Parvar, H. (July 2006). (news article in Persian). Retrieved from <http://www.reporter.ir/archives/85/3/003652.php>