

# **Tunisia ICT Sector Performance Review 2009/2010**

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*Towards Evidence-based ICT Policy and Regulation  
Volume Two, Policy Paper 12, 2010*

# **TUNISIA**

# Research ICT Africa

Research ICT Africa is a non-profit public research network, which is concerned with information and communication technology (ICT) development policy and its governance. It is based in Cape Town, South Africa and is under the direction of Dr. Alison Gillwald. It aims to bridge the strategic gap in the development of a sustainable information society and a knowledge-based economy by conducting research on the policies and governance of the necessary ICT to document efficient governance in Africa. Initially financed by the CRDI, the network tries to extend its activities through national, regional and continental partnerships. The creation of the Research ICT Africa network meets the growing need for data and analysis necessary for an appropriate but visionary policy in order to propel the continent into the information age. Through the development of a network, RIA seeks to build an African knowledge base capable of supporting the ICT policy and regulation processes and to ensure that the development of these processes is monitored on the continent. The research, coming from a public interest agenda, in the public domain and individuals, public and private sector entities and civil society are also encouraged to use it for training, future research or to make the most of it in order to enable them to participate more efficiently in the formulation of ICT policy and governance on national, regional and global levels. This research is made possible thanks to significant funds received from the International Development and Research Centre (CRDI), Ottawa, Canada, to whom the members of the network express their gratitude for its support. The network is formed by 18 African countries. Similar national studies are available for South Africa (Kammy Naidoo/Steve Esselaar), Benin (Dr. Augustin Chabossou), Botswana (Dr. Patrica Makepe), Burkina Faso (Dr. Pam Zahonogo), Cameroon (Prof. Olivier Nana Nzèpa), Côte d'Ivoire (Prof. Arsene Kouadio), Ethiopia (Dr. Lishan Adam), Ghana (Dr. Godfred Frempong), Kenya (Dr. Tim Waema), Mozambique (Francisco Mabila), Namibia (Dr. Christoph Stork), Nigeria (Prof. Ike Mowete), Rwanda (Albert Nsengiyumva), Senegal (Mamadou Alhadji Ly/Mar Cathy Dieng Sylla), Tanzania (Bitrina Diyamett), Tunisia (Prof. Farouk Kamoun) and Uganda (Dr. Nora Mulira).

Series Publisher: Dr. Alison Gillwald. Assistant publishers: Enrico Calandro and Mpho Moyo

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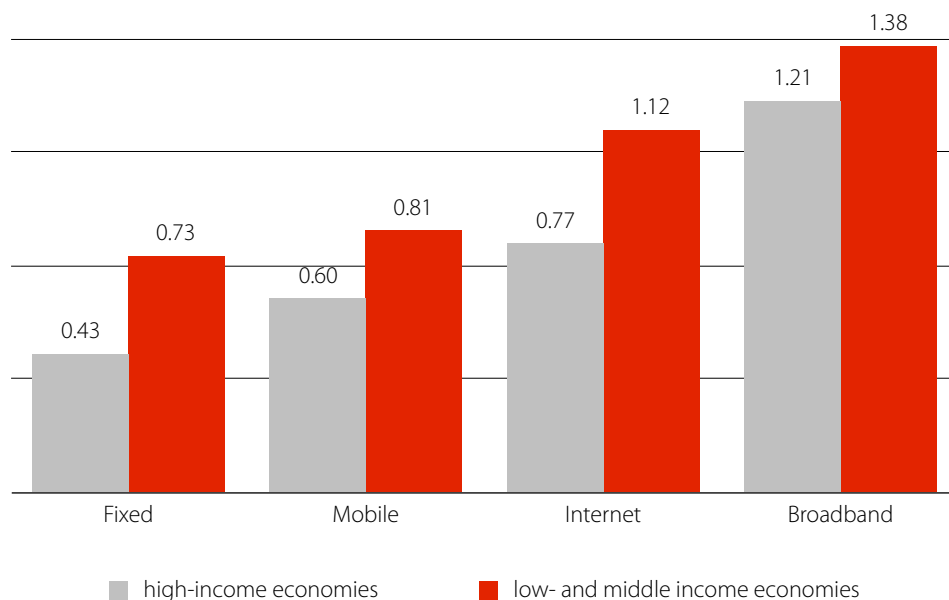
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## Introduction

In the past couple of decades the telecommunication sector has played an important role in the economic growth of the country. Studies by the World Bank on 120 countries show that each increase of 10 percentage points in broadband service penetration corresponds to an increase in economic growth of 1.3 percentage points (Qiang, 2009) [CEA, new, doc 23].



**Figure 1: Effect of ICT on growth**

Source: Qiang, 2009.

Note: The Y-axis represents the increase in percentage points in economic growth by an increase of 10 percentage points in telecommunication penetration.

*Tunisia has been involved in the development of the telecommunication sector for a few decades now*

Tunisia has been involved in the development of the telecommunication sector for a few decades now. In order to speed up this development, it undertook the liberalization of the sector. The fundamental policies and directions are centred mainly on building the knowledge society, strengthening economic competitiveness and improving private sector efficiency by developing exports and winning the employment challenge (<http://www.investissement.tn/article.php?id=109>).

The Tunisian experience in the telecommunications sector is worth evaluating in order to learn some lessons from it. The objective of the current report is to carry out a review of the performance of the telecommunications sector in Tunisia to highlight its strong and weak points. This analysis will enable us to draw lessons and to suggest recommendations that can be useful to sector development.

This report is structured around the following points:

- ICT policy ;
- the legal and regulatory framework ;
- sector regulation ;
- market structure ;
- analysis of the Telecoms, Internet and radio and television broadcasting market ;
- network and infrastructure development ;
- pricing ;
- human capital ; and
- the main IT applications



## ICT Policy: Vision, Strategy and Execution

Before addressing the Tunisian telecommunication sector, a few figures must be given to map out Tunisia's profile. This data is summarized in table 1.

**Table 1: Country data**

	Year	Latest Data
GDP (current US\$) (billions)	2008	40,2
GNI per capita, Atlas method (current US\$)	2008	3 290
External debt stocks (% of GNI)	2007	60,8
Life expectancy at birth, total (years)	2007	74
Population, total (millions)	2008	10,3
Population growth (annual %)	2008	1,0
School enrollment, primary (% net)	2007	95,0
Surface area (sq. km) (thousands)	2008	163,6

Source: <http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20535285~menuPK:1390200~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html>

In the 1980s, Tunisia began a policy aimed at ICT development to modernize other economic sectors and to improve the competitiveness of companies on one hand and on the other hand to encourage the ICT sector itself as an economic sector, in its own right a creator of wealth and high value added employment. In order to be able to target its actions over time, strategic plans were designed in the framework of five-year economic and social development plans.

These plans define the strategic axes and quantitative and qualitative objectives.

The development of the legal and regulatory framework, communication infrastructures, online services and human skills feature, among others, in the directions planned in the 11th Development Plan. (<http://www.infocom.tn/index.php?id=125>).

It should be mentioned that since 2002, Tunisia has moved towards the liberalization of the communication sector. This process was consolidated by legal and regulatory measures and by the strengthening of regulatory structures. In this framework, it plans to promote competition and the contribution of the private sector to the telecommunication service offering, to implement digital economy regulation and to strengthen and adapt security regulations.

The directions of the 11th plan have been translated into quantitative plans.

On an economic level, the main objectives (2006–2011) are:

- an average annual growth rate in the added value of the ICT sector of 17.5%, bringing the sector's share to GDP from 8% at the end of 2006 to 13.5% at the end of 2011 ;
- a global investment volume (public and private) of 6,300 million Tunisian Dinar (MDT)<sup>1</sup> ; of which 3,856 is in the telecommunication field and 2,444 in the IT field ;
- the creation of 50,000 new jobs ; and
- an ICT export value of 350 MDT

Table 2 shows the development of the main sector aggregates.

<sup>1</sup> 1 \$US = 1.3 Tunisian Dinar (DT)

**Table 2: Future performance and objectives of the ICT sector**

ICT Sector Aggregates	10 <sup>th</sup> Plan 2002-2006	11 <sup>th</sup> Plan 2007-2011
Average annual growth rate of the sector added value (%)	20	17.5
Contribution of the ICT sector to GDP (%)	8	13.5
Investment volume (millions of Dinar)	5302	6300
Telecommunications	3204	3856
Information technologies (IT)	2098	2444
ICT investments as % of total national investment	13.1	10
Job creation in ICT (in thousands)	30	50
ICT share in the total job creation in %	8	11.7
Value of ICT exports (millions of Dinar)	220	350

Source: <http://www.infocom.tn/index.php?id=125>

*The evaluation at the end of 2008 identifies a contribution from the ICT sector to GDP of 10% of the average annual growth rate of the sector added value of 17,8% which corresponds to the forecasts of the five-year plan (2007-2011)*

The evaluation at the end of 2008 identifies a contribution from the ICT sector to GDP<sup>2</sup> of 10%. The average annual growth rate of the sector added value of 17.8%, which corresponds to the forecasts of the five-year plan (2007–2011).

The objectives for 2011 relating to infrastructure are:

- to reach a telephone density of 108% ;
- to reach a ratio of 18 computers per 100 inhabitants ;
- to bring the proportion of households equipped with computers to 30% ;
- to bring the proportion of households connected to the Internet network to nearly 20% ;
- to increase the capacity of the international Internet bandwidth so as to reach a speed of 5 Gb/s ;
- to bring the number of Internet network subscribers to 1,2 million ;
- to reach the five-million mark for Internet users, or as many as there are e-mail addresses (<http://www.infocom.tn/index.php?id=125>).

Table 3 shows the development of infrastructures between 2006 and 2011.

**Table 3: ICT infrastructure indicators**

Infrastructure Indicators	2006	Intermediate Achievements	2011
Number of fixed-line and mobile telephone subscribers (Millions)	8.6	9.8 (end 2008)	11.6
Telephone density	84.5	94.7 (end 2008)	108.0
Number of computers per 100 inhabitants	6.3	9.62 (end 2008)	18.0
Household computer penetration rate	7.9	--	30.0
Number of Internet users (millions)	1.295	2.8 (end 2008)	5.0
Number of Internet subscribers (thousands)	180	281 (end 2008)	1200
Household Internet penetration rate	3%	--	20%
Number of websites	4930	6,467 (end 2008)	20000
Number of high speed connections (Millions)	0.06	0.21 (end 2008)	1.4
Bande passante Internet Internationale (Gbit/s)	1.28	8.75 (end 2008)	5.0

Source: 11th Development Plan 2007-2011.

<sup>2</sup> Source: [http://www.investir-en-tunisie.net/index.php?option=com\\_content&view=article&id=469:secteur-des-tic-la-tunisie-classee-premiere-au-maghreb-et-en-afrique&catid=62:rechercheveloppement&Itemid=148](http://www.investir-en-tunisie.net/index.php?option=com_content&view=article&id=469:secteur-des-tic-la-tunisie-classee-premiere-au-maghreb-et-en-afrique&catid=62:rechercheveloppement&Itemid=148)

The evolution of telephone density is in accordance with the forecasts. Internet bandwidth has exceeded expectations and even the 2011 objective. This capacity increased to 27.5 Gbit/s in November 2009, thanks to the activation of a new trans-Mediterranean cable (cf. section 7 of this report).

Nevertheless, the achievement of certain objectives falls short of expectations. This essentially involves the prevalence of computers and the number of high-speed Internet subscribers.

At the level of developing human skills, the plan makes provision for:

- strengthening ICT teaching and usage in all the educational subsidiaries and on all levels; and
- the consolidation and development of training of ICT specialists, qualified technicians, supervisory personnel, engineers etc.

The plan also makes provision for the consolidation and the development of electronic administration, notably through the implementation of online services.

To modernize the economic fabric, incentive measures for ICT use by companies are contemplated in the 11th Plan.

It is planned to strengthen the private ICT sector notably through the development of financial mechanisms and public-private partnerships (PPP). For that purpose, Act 2007-13 relating to the establishment of the digital economy was promulgated in February 2007. It established the legal framework for the development of PPP in the ICT sector.

The 2009–2014 presidential programme reinforces the directions of the plan, notably by emphasizing high-speed infrastructures (a million new ADSL lines by 2014) and research and innovation in the ICT sector.

*Nevertheless, the achievement of certain objectives falls short of expectations. This essentially involves the number of computers per 100 inhabitants and the number of high-speed Internet subscribers*

## Legal and Regulatory Framework and Regulation

### Legal and Regulatory Framework

The telecommunication sector has been subject to reforms since the end of the 1990s.

It should be mentioned that Tunisia signed an agreement with the WTO in 1997, which obliges it to liberalise the telecommunication sector. The agreement makes provision for a roadmap, which includes the allocation of a second mobile licence, a licence for a data transmission operator, a licence for a fixed-line operator and the partial privatization of the incumbent operator.

The opening of the telecommunication sector created a new context for the incumbent operator on the one hand, and on the other necessitates a definition of the action rules for operators who plan to establish themselves in the Tunisian market. In order to organize the sector in this new framework, a telecommunications code was promulgated in 2001. This organization includes:

- the installation and operation of telecommunication networks ;
- basic telecommunication service provision ;
- telecommunication service provision ;
- broadcasting service provision ; and
- management of rare telecommunication resources (Article 1, Telecommunications Code 2001)

This code regulates the opening of the telecommunications market to the private sector. Other major innovations of this Act of 2001 include the creation of a regulatory authority in charge of telecommunication (the Instance Nationale des Télécommunications INT) and the Agence Nationale des Fréquences (ANF) in charge of frequency spectrum management.

The implementation of the telecommunications code of 2001 was facilitated by the publication of different application texts in the spirit of reform. This code was amended in 2008. The new code reinforces the role of the INT and introduces new clauses relating to the liberalization of fixed telephony such as location, infrastructure sharing, unbundling, interconnection, the determination of rates and conditions of use of public telecommunication networks and access networks.

In addition, the code of 2008 introduces the notion of universal service by replacing the notion of basic services indicated in the code of 2001. "Basic services" are to be understood as access throughout the territory of minimum telephone services, the routing of emergency calls and the provision of information services and subscriber directories.

A technical and regulatory framework was also promulgated in 2008, aimed at modernizing and diversifying telephone services through VoIP (Decree no. 2008-2638 laying down the conditions of telephone service provision or Internet protocol). Other decrees specifying the application of the Act of 2008 were promulgated over the course of the same year (cf. appendix 1 "Main events in telecommunication regulation January 2008 – July 2009").

### Sector Regulation

Before addressing the regulation of the telecommunication sector, it is useful to position the regulatory organs in relation to the governance institutions that are in place. In this framework, it is necessary to distinguish two categories: the Ministry of Communication Technology (MCT) and its attached agencies, and the independent regulatory agency, the INT.

"The Minister's task is to implement a regulatory framework that organizes the sector and its planning, control and supervision in order to allow the country to acquire new technologies. It also ensures development support, attracts investments and encourages export efforts and the competitiveness of Tunisian companies." (<http://www.infocom.tn/index.php?id=20>).

The regulatory task of the Ministry relates to:

- the authorization of telecommunication service provision (with the exception of universal telecommunication services, television broadcasting services and any other service appointed by decree) ;
- the approval of requirement specifications for the provision of universal services, television broadcasting services and any other services appointed by decree ;

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- the approval of maximum rates applied to universal telecommunication services (by order) ;
- the allocation of licences to install an operator public telecommunication networks (object of an agreement between the State represented by the MCT and the operator) ;
- the authorization of installation and operation of independent private networks ;
- the allocation of access network installation and operation licences ;
- drawing up a numbering and addressing plan ;
- setting charges for the allocated numbers and addresses.

In addition, the MCT managed the Communication Development Fund, whose budget comes from a tax of 5% on the turnover of telecommunication operators. This fund finances the activities of the Tunisian Post Office, the Office National de Télédiffusion and other ICT promotion activities.

The Ministry is assisted in the execution of its tasks by various organisations. The essential tasks and notably those relating to regulation are described below:

- The Agence Tunisienne de l'Internet (ATI), created in 1996, is the only wholesale international Internet access provider in Tunisia. It provides state-of-the-art national Internet exchange functions, the management of the national domain ".tn" and the management of IP-addressing in Tunisia on behalf of the INT (source: ATI site) ;
- The Agence Nationale de Sécurité Informatique (ANSI), created in 2004. carries out the general monitoring of IT systems and relevant networks of diverse public and private organisations. It sees to the implementation of national directions and the general strategy for IT systems and network security and the fulfilment of regulations relative to the obligation of the periodic audit of IT systems and network security (source: ANSI site). The agency is a member of FIRST (Forum for Incident Response and Security Teams), of the "Network of Centres of Excellence" of the CNUCED and the OIC-CERT (Organisation of the Islamic Conference – Computer Emergency Response Team).

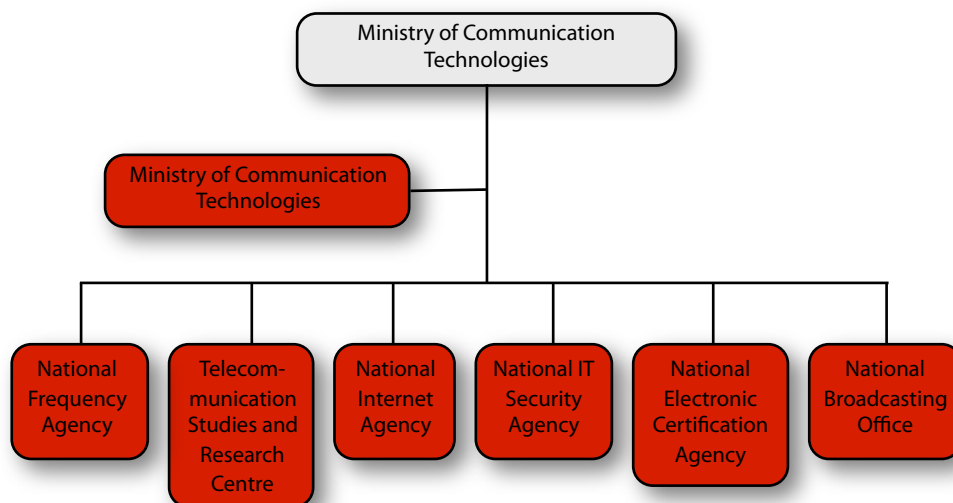
"The Agence Nationale de la Sécurité Informatique makes a help desk and support centre for IT security (Computer Emergency Response Team) available. This help desk offers assistance concerning all problems relating to the security of information systems free to citizens and professionals, and sees to the availability of appropriate means to ensure the protection of the national cybernetic space. It also aims to inform and raise the awareness of the national community on security threats and to guide it on methods of protecting itself."<sup>3</sup>

Through the obligatory audits of administrations and public companies and awareness raising and training in IT security, the ANSI contributed noticeably in improving the monitoring of security in these organisations and in the country in general.

- The Agence National de Certification Électronique (ANCE). It is essentially in charge of:
  - securing transactions and electronic exchanges in the fields of e-commerce, e-government, e-banking, e-finance, e-teaching, e-health etc. ;
  - establishing mutual recognition agreements with foreign Certification Authorities ;
  - managing electronic certificates (generation, revocations, publication and conservation of certificates) ;
  - granting operating licences to electronic certification service providers ;
  - carrying out the approval of the encryption systems (Decree no. 2001-2727 of 20 November 2001) (source: ANCE site).
- the Office National de la Télédiffusion (ONT). Its task is to ensure the exclusive broadcast of radio and televised programmes in Tunisia. It strives to create, operate, maintain and expand the broadcast network of radio and televised programmes.
- the Centre d'Études et de Recherche des Télécommunications (CERT ). It is in charge of a research task, a technical expertise and study task and the task of the approval and technical control of the import of public telecommunication network terminals and radio electric equipment.
- the Agence Nationale des Fréquences (ANF) created by the Act of 2001. It is in charge of the following tasks:
  - drawing up the National Radio Frequency Plan in coordination with the competent organisations;

<sup>3</sup> [https://tuncert.ansi.tn/publish/module/vulnerabilite.asp?id\\_vul=1256](https://tuncert.ansi.tn/publish/module/vulnerabilite.asp?id_vul=1256)

- the management of radio electric frequencies in coordination with the competent organisations;
- controlling the technical conditions of radio electric equipment and protection of the use of radio electric frequencies;
- controlling frequency use in accordance with licences awarded and frequency register records;
- seeing to the application of international agreements and treaties in the radio communication field (source: Act of 2001).



**Figure 2: MCT and organisations under its supervision**

The independent regulatory organisations are:

- the Instance Nationale des Télécommunications (INT) ;
- the Instance Nationale de Protection des Données à Caractère Personnel (INPDCP) ; and
- the Competition Council.

The INT was created by the Act of 2001 and participates in the establishment of healthy and fair competition between stakeholders. It acts as an arbitration authority. It intervenes in the framework of four main tasks:

- Issuing of opinion:
  - Optionally on the method of determining the network and service rates for any project entering into the framework of its remit and which is brought before it by the ministry in charge of telecommunications.
  - Compulsory on the list of basic telecommunication services (universal service), the granting of the licence to install and operate private telecommunication networks and on the setting of the amount of the licence fee.
- Management of the National numbering and addressing plan:
- Task of examining and resolving disputes relating to interconnection. Deal with applications brought before it, give a ruling on these applications and notify the persons concerned of the decision relating to it, which must be motivated and which is then enforced.
- Task of controlling the compliance with obligations resulting from legislative and regulatory clauses in the telecommunications field.

Apart from the above-mentioned tasks, other important allocations should be pointed out, such as the approval of technical and pricing offers for interconnection services and contract models put forward by operators to the public, the examination of rate modification projects and the option of changing them, if necessary.

The Instance Nationale de Protection des Données à Caractère Personnel (INPDP) was created in 2004 (Act 2004-63). This Act establishes a personal data protection system. Decree 2007-3003 (November 2007) specifies the organization and functioning of the INPDP, the foundations of which are inspired by international practices.

Among its tasks, the INPDP grants licences and receives notifications for the implementation of personal data processing. It deals with complaints made in the framework of its competencies and determines the essential guarantees and appropriate measures for the protection of personal data.

The competition council has juridical personality and autonomy. It rules, inter alia, on applications pertaining to anti-competitive practices, that is to say, cartels and abuse of the dominant position (<http://www.commerce.gov.tn/conseils.htm>).

### Analysis

According to legal texts, the public authorities have awarded INT its independence. As Abdellatif Abdeljaouad (2003) claims: "The legislator differentiates it from other similar organisations by giving it the authority, guarantees, the organization and the legal and human and material means of a true regulatory authority, institutionally independent with reference to the parties involved". Indeed, the INT is endowed with juridical personality and financial independence and has large allocations which it received by law. Its own financial resources come from the numbering and addressing charges. Also, the legislator "has exempted it from administration and financial management procedures applied to public companies and establishments and has given it its own procedures, characterized by flexibility" (INT report, 2003).

This independence does not exclude the cooperation between the INT and the MCT and the agencies under its supervision. For that matter, the INT sub-contracts the management of the national domain ".tn" and the management of IP addressing in Tunisia to the ATI. It holds an advisory authority in regulation and normalization. The INT is authorized to impose administrative and financial sanctions against operators who violate the law but it is not competent to allocate operating licences.

At the level of execution, the INT played an important role in setting up the second mobile operator and the functioning of the mobile market. Since its entry in 2002, the second mobile operator has been able to increase its market share, currently reaching about 50% of the total market. The INT periodically performs measurements of mobile telephone service quality. Nevertheless, it does not yet perform such measurements for service quality concerning fixed-line telephones and the Internet.

The INT does not approve operator rates but it issues an opinion on their pricing offers.

It should be noted that the INT does not intervene in the management and monitoring of the use of radio electric frequencies. These tasks are the responsibility of the ANF.

It should also be pointed out that as for competition, complaints relating to the telecommunication sector can be brought not only before the INT but also before the Competition Council. It should be noted that these two options available to operators could be a source of confusion and it would be appropriate to better define the fields of competence of the INT and the Competition Council to eliminate possible overlapping.

In conclusion, it should be mentioned that the regulatory landscape is characterized by the multiplicity of stakeholders (INT, ATI, ANF etc.). Such a landscape certainly promoted the specialization of organisations, but it slows down integration and increases the participants for operators and ISPs. After a training process, it would be suitable to revisit the tasks of these organisations and to think about mergers to reduce the number of participants for operators and ISPs on the one hand and on the other hand to better use skills and carry out synergies.

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## Evaluation of the Telecommunication Regulatory Environment

In order to evaluate the telecommunications regulatory environment (TRE) for the period from January 2008 to July 2009 for the fixed-line, mobile and Internet telecommunications sectors, a TRE questionnaire was submitted to a sample of 66 people selected for their knowledge of the sector. The respondents are divided into three categories:

- category 1: stakeholders directly affected by the regulation of the telecommunication sector such as operators, professional associations linked to the sector, equipment providers and resellers (32)
- category 2: stakeholders who analyse the sector with a larger interest such as financial institutions, telecommunication consultants and law firms (13)

- category 3: stakeholders who have an interest in improving the sector to help the public such as universities, research organisations, journalists, telecommunication user groups, civil society, former members of regulatory organs and other governmental organisations and silent partners (21)

34 completed questionnaires were collected. The respondents are divided as follows:

- 18 in category 1
- 7 in category 2
- 9 in category 3

The aspects used in this questionnaire rest largely on the reference document of the 4th protocol of the Accord Général sur le Commerce des Services (AGCS) and are briefly described in Appendix 2. These aspects relate to market entry, rare resources, interconnection, price regulation, regulation of anti-competitive practices, the universal service obligation (USO) and service quality (SQ). A fact sheet of key events that took place in the telecommunication regulatory environment is also attached for consultation purposes for the period beginning January 2008 and ending July 2009.

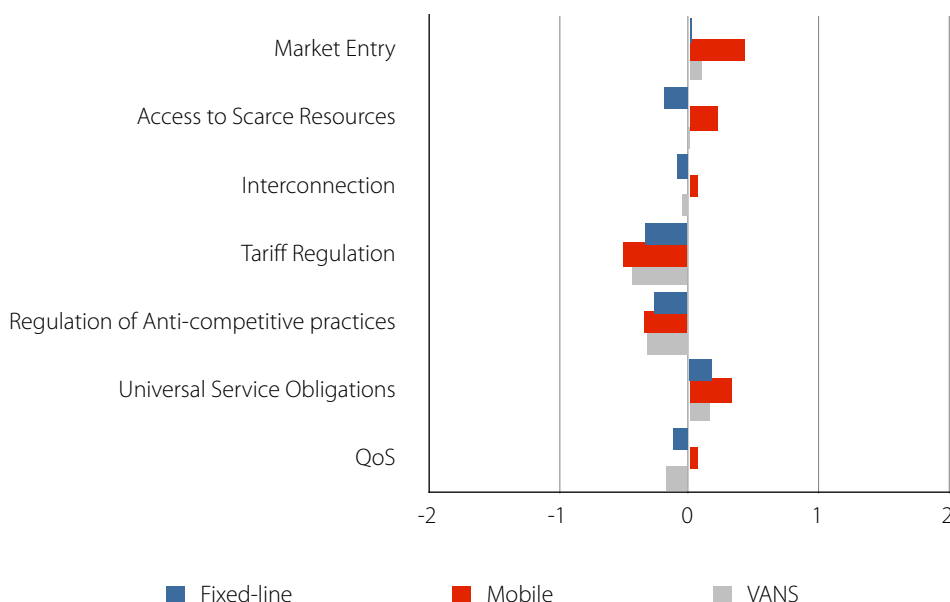
The respondents were asked to give their degree of satisfaction on the quality of the regulatory environment for each aspect. The evaluation grid consists of 5 points: (1) very unsatisfied, (2) unsatisfied, (3) rather satisfied, (4) satisfied and (5) very satisfied. During the processing of the results, the original scale was transposed to another from (-2) to (2), keeping the same intervals. For each category of respondent, a simple average for each indicator was calculated. Also, a simple average for the three categories together and for each indicator was calculated according to the methodology proposed by RIA (TRE).

*The data analysis enables us to identify that the respondents are overall “rather satisfied” with weak dispersion*

The data analysis enables us to identify that the respondents are overall “rather satisfied” with weak dispersion. The mobile telecommunication sector concentrates the most positive evaluation out of the five aspects (market entry, rare resources, interconnection, universal service obligation [USO] and service quality [SQ]) as shown in the figure below. A possible explanation for this result comes from the fact that the mobile sector has been open to competition since 2002, when a mobile telephone licence was granted to a private operator in addition to the incumbent operator.

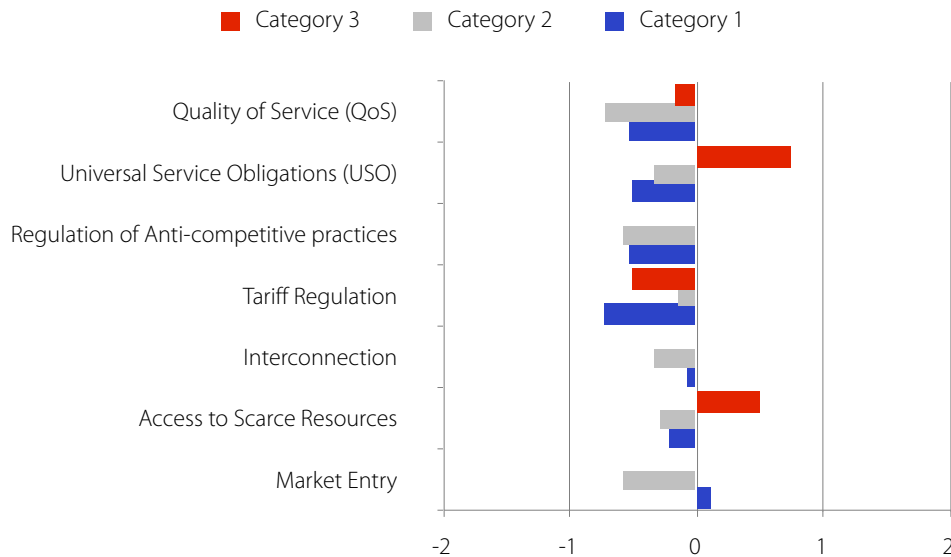
Also, the broadband sector is the least well perceived overall compared to the other two sectors. The average of the 7 aspects is -0.23 compared to -0.11 for fixed lines and 0.04 for mobiles.

*The broadband sector is the least well perceived overall compared to the other two sectors. The average of the 7 aspects is -0.23 compared to -0.11 for fixed lines and 0.04 for mobiles*



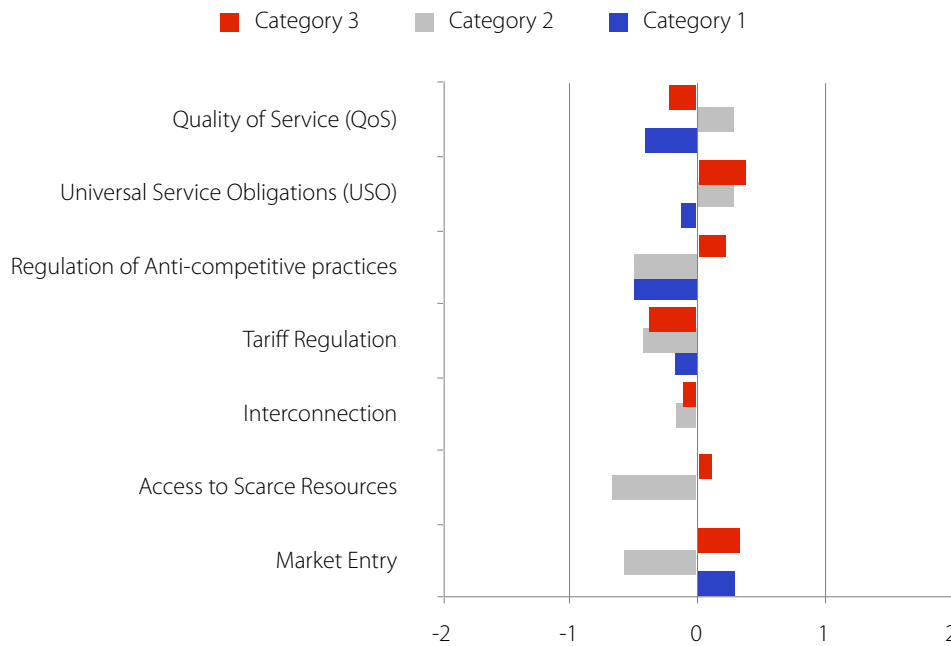
**Figure 3: Overall assessment of the regulatory environment for the 3 sectors, broadband, fixed line and mobile.**

The respondents’ assessments of the broadband network reveals that the most significant differences between the evaluations of the three categories are found on the level of universal services and access to rare resources (cf. Figure 4). The three categories remain rather satisfactory even if the dispersion is slightly more significant around zero.



**Figure 4: Assessment by the three respondent categories of the broadband sector regulatory environment.**

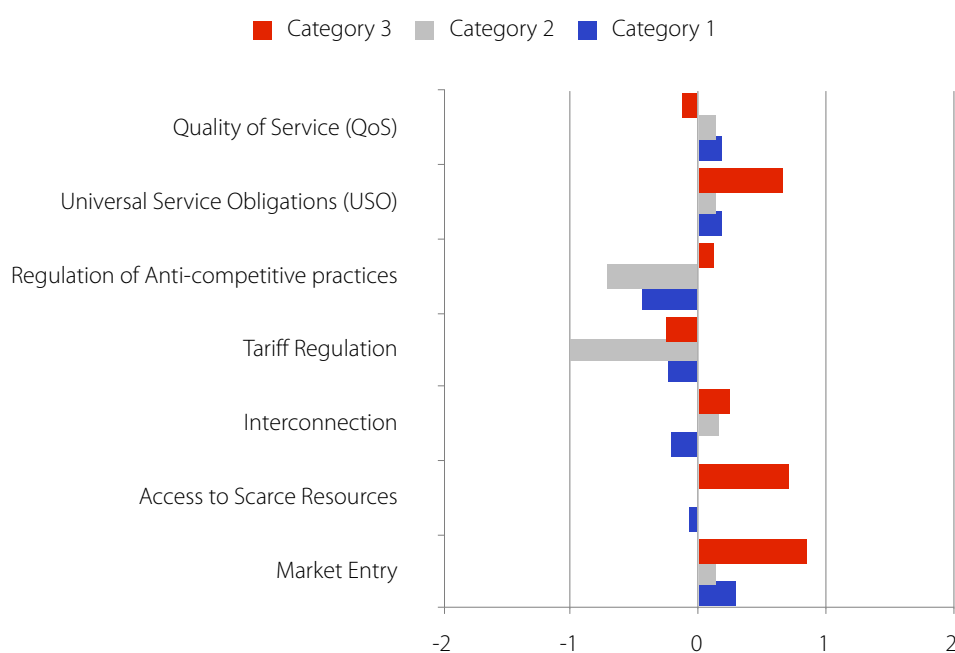
As far as fixed-line telephones are concerned, category 2 displays the weakest satisfaction level compared to the other categories (cf. Figure 5).



**Figure 5: Assessment by the three respondent categories of the fixed-line telephone sector regulatory environment.**

Price regulation and that of anti-competitive practices relating to mobile telephones are the aspects on which the most negative evaluations are focused with values of -1 and -0,71 respectively (cf. Figure 6).





**Figure 6: Assessment by the three respondent categories of the mobile telephone sector regulatory environment.**

At the end of the day, a comparison of the averages for the three categories on the three types of networks shows that category three is the most satisfactory while respondent category 2 is the least satisfactory as reported in the table below. For each of the three categories, broadband remains the least satisfactory in relation to fixed line and mobiles, confirming the overall assessment of all categories for all the respondents.

**Table 4: Assessment of broadband, fixed lines and mobiles by the three respondent categories.**

Category Sectors	Broadband	Fixed Line	Mobile	Average Assessment per Category
Category 1	-0,35	-0,13	-0,04	-0,17
Category 2	-0,42	-0,25	-0,16	-0,28
Category 3	0,08	0,05	0,32	0,15
Average assessment by network type	-0,23	-0,11	0,04	

The analysis of survey results for each of the three categories (intra-category analysis) on the different networks shows that:

- category 1 assesses the price regulation of broadband the lowest, followed by anti-competition practices and then broadband service quality. In addition, the regulation of anti-competitive practices is assessed the lowest compared to other aspects for fixed-line telephones as well as mobile telephones. It is followed by service quality for fixed-line telephones (see table in Appendix 3: Category 1).
- category 2 records the lowest evaluation on the aspect of mobile price regulation with a value of -1 for all the networks and on all aspects. The aspects “anti-competitive practices” for mobiles and “service quality for broadband” were evaluated at -0.71 each (see table in Appendix 4: Category 2).
- category 3 assesses market entry, access to rare resources and regulation relating to universal service for mobile telephones at 0.86, 0.71 and 0.67 respectively.

## Market Structure

The telecommunications sector was characterized by a state monopoly until the promulgation of the telecommunications code in 2001. This code opened the telecommunications market to competition. The first reforms consisted of transforming the structure of the telecommunications service provider, firstly into the Office National de Télécommunication in 1995, which in turn was transformed into Tunisie Telecom in 1999, then restructured into a limited company in 2002. Tunisie Telecom was partially privatized up to 35% in 2006, and acquired by the consortium Emirati TeCom-DIG. Tunisie Telecom was only confronted with competition in the mobile segment in 2002, after a licence was granted to a private operator, Tunisiana (second operator), which was formed by the operator Orascom Telecom (Egypt) with the help of local investors (up to 15%). Tunisiana currently has only two shareholders with 50% each. They are Orascom Telecom and Q-Tel (Qatar Télécom).

A second licence for the implementation and operation of public data transmission networks via VSAT satellite was granted in 2004 to another private operator, DIVONA Télécom with Tunisian capital. This operator was given a WIMAX data transmission licence in 2007.

The duopoly mobile market structure lasted until 2009 when a third licence was granted. This third licence enabled the strengthening of competition at the mobile level and introducing it at the fixed-line level. The third operator, Divona-Orange, held up to 51% by the Tunisian-owned group Divona and 49% by Orange (France Télécom) started business in 2010. It obtained the market following a call for tender for an installation and operation licence of Public Telecommunication Networks to provide fixed-line telecommunication services combined with 2G/3G mobile telecommunication services. The licence is technologically neutral and open in terms of services and infrastructure choices.

In accordance with the regulation, this third operator will notably have the right to access existing infrastructures, national roaming, obtaining frequencies, numbering and international code resources, interconnection, obtaining the status of Internet service provider, the provision of IP telephone services and the use of the licence over a period of 15 years with the option of extending it. To give this new operator time to establish itself in the market, the Tunisian government decided that no additional fixed-line licences will be allocated before at least 1 January 2013 and that the allocation of 3G licences to the other operators will only take place in 2011. The three operators, Tunisie Telecom, Tunisiana and Divona-Orange (Orange-Tunisie) have international connections.

In conclusion, in 2010 the competitive landscape in the telecommunication sector, with its different segments of activity and operators, is characterized by a duopoly situation on the fixed-line level, a one year monopoly for services linked to 3G, the intervention of three operators on the mobile level and five private ISPs with one operator (cf. Table 5). Having started operations in May 2010, it is too early to predict the effects of the arrival of the third operator on the older operators. However, it has to be expected that with this new competitor, the telecommunication sector will undergo changes that will effect its price and quality strategy, on the one hand, and the proactive and reactive actions of the incumbent operators and Tunisiana on the other hand. Competition will be at stake, perhaps, at the level of telecommunication services and value-added services, as well as on the level of high-speed Internet. On this level, it has to be noted that Orange-Tunisie will have the advantage of experience and an innovation capacity from the main branch, while Tunisie Telecom can only rely on its own strengths due to the fact that the private shareholder did not bring technological know-how, but instead played the role of financial partner. Also, the fact that Tunisie Telecom lived through various decades in a monopoly situation with a rather bureaucratic structure promoted the emergence of a culture which is less inclined to innovation and competitiveness. The success of Tunisie Telecom in, this new competitive structure, will depend on the content and speed of its process of organizational change, which has already started. As for Tunisiana, which leans on an international group that operates in the telecommunication sector, it has the advantage of being able to count on the resources and competencies of the group, even though at the 3G level it is as disadvantaged as Tunisie Telecom given that Orange-Tunisie has held the monopoly during its first year of operation in accordance with the licence which it was granted.

*The third operator, Divona-Orange, held up to 51% by the Tunisian-owned group Divona and 49% by Orange (France Télécom) started business in 2010. It obtained the market following a call for tenders for an installation and operation licence of Public Telecommunication Networks to provide fixed line telecommunication services combined with 2G/3G mobile telecommunication services*

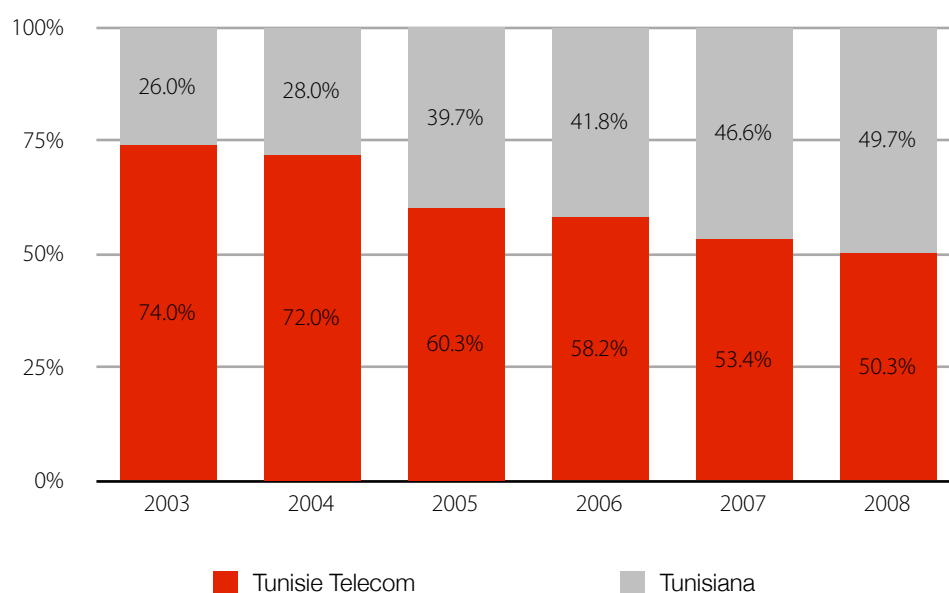
*In conclusion, in 2010 the competitive landscape in the telecommunication sector with its different segments of activity and operators is characterized by a duopoly situation on the fixed-line level, a one year monopoly for services linked to 3G, the intervention of three operators on the mobile level and five private ISPs with one operator*

**Table 5: Competitive landscape of the fixed line, mobile and Internet segments**

	Number of Operators 2009	Number of Operators 2010	Number of Operators 2011
<b>Fixed-line segment</b>			
Telephone	1	2	2
Data transmission	2	2	2
<b>Mobile segment</b>			
Telephone and messaging service service erie	2	3	3
Data transmission	2 'EDGE'	2 'EDGE' 1 '3G'	3 '3G'
<b>Internet Segment</b>			
	5 Private 7 Public	5 Private* 7 Public	5 Private** 7 Public

\* the holder of the third licence is a joint venture (Orange Tunisie) between a multi-national (Orange) and a private Tunisian operator (Divona). Seeing as Divona belongs to the group, which already has an ISP Planet and which already corners 35% of market share, it is not yet clear whether this group is going to experience internal competition by providing Internet services by two entities or whether it will carry out this activity through its ISP Planet

\*\* according to the strategy of the new operator, other ISP can react by strategic operations (mergers, acquisitions, strategic alliances), which will have an impact on the competitive landscape

**Figure 7: Evolution of mobile telephone market share for each operator between 2003 and 2008**

Source: INT Report, 2008

The figure above shows the evolution of mobile market shares of the two operators between 2003 and 2009. As demand increased, the two operators were able to grow rapidly to arrive at an almost equal distribution of market share without dominance of one or the other. This evolution demonstrates the performance of the regulatory systems implemented. It should be mentioned that the existence of this duopoly, combined with the development of the segment towards the maturity stage, has motivated the two operators to diversify their offers. However, the appearance of a new offer from one of the two competitors often prompts the other to align itself by proposing a similar offer.

In this framework, the technical and pricing offers of interconnection for the fixed line and mobile networks between the operators are passed on to the regulation authority who defined an approach in order to lead to an agreement. This approach is carried out in four main stages:

- Study of the two interconnection offers
- Presentation of observations, remarks and reservations to each of the two operators for revision
- Request of opinion of each operator on the revised version of the other operator in order to give its observations
- Approval of the two offers

The last pricing agreement to date was approved in 2008 (INT Report, 2008).

## Analysis of the Telecoms, Internet and Radio and Television Broadcasting Markets

The operators in the telecommunication market are:

- Tunisie Telecom, which is the incumbent operator and the only fixed-line operator until 2009, only mobile operator until 2002 and satellite operator ;
- Tunisiana, which is the second 2G GSM mobile operator and obtained its licence in 2002 ;
- Divona, which was created in 2004 following the concession by the Tunisian Government of a VSAT network installation and operating licence. In 2007 it obtained a Wimax licence ;
- The group Divona Tunisie/Orange France Telecom obtained its licence in 2009. This licence applies to fixed telecommunication and 2G and 3G mobile telecommunication and the provision of Internet services. The allocation of 3G licences to the operators Tunisiana and Tunisie Telecom could only intervene in a period of about one year.

### The Telecommunications Market

Until 2002, the telecommunications market was characterized by a monopoly situation on offers from the incumbent operator (Tunisie Telecom) for fixed-line and mobile telephony. Tunisie Telecom's offer was addressed to two large market segments, namely companies and the general public.

The differentiation of the offer according to more acute market segmentation increased with the increase in the number of subscribers and the sharing of the market between the two operators (Tunisie Telecom and Tunisiana).

It should be mentioned that Tunisiana was able to develop rapidly as it chose from the beginning to create a franchised network across the Tunisian territory. The franchisees offer both the devices and subscriptions to mobile telephony. This strategy, as a distribution method, has allowed Tunisiana to rapidly expand its network and to bring it closer to potential clients without having to bear investment fees. In a second development phase, besides franchisees, Tunisiana created its own distribution centres in various areas.

On the contrary, Tunisie Telecom continued to distribute mobile telephone subscriptions through its own network of sales offices, which currently consist of 80 shops (<http://www.tunisiatelecom.tn/tt/internet/fr/tunisiatelecom/entreprise>). It should be mentioned that this network is not limited to mobile telephone products but also includes other fixed-line telephone products and services, which allows for the sharing of costs between the two activities. It seems that Tunisie Telecom shared resources and the effects of synergies between the two fixed-line and mobile activities. However, for the marketing of recharge cards for prepaid mobiles, Tunisie Telecom relies on a network of 13,000 private points of sale. This network is not exclusive as we also find Tunisiana recharge cards here. Subsequently, Tunisie Telecom signed an agreement to distribute its mobile lines with three distributors who represent mobile telephone brands in Tunisia

Tunisiana's distribution method is one of the explanatory factors in its success on the mobile market. It has currently reached a market share of about 50% in a duopoly market where the incumbent operator had a largely dominant competitive position.

In addition, Tunisiana's marketing approach, with advertising campaigns addressed at the youth, has increased its reputation and allowed it to acquire a significant portion of this segment. Tunisie Telecom reacted by launching a new mobile product designed for the youth in 2009.

Currently, the segmentation of the general public clientele is performed on the basis of age criteria distinguishing the youth and other categories. This segmentation is justified by the fact that the youth make up a significant segment, keeping in mind the age pyramid of the Tunisian population and the specificity of this segment at the level of the budget and needs.

After the investments supplied by Tunisiana for the general public, it turned towards companies, a segment previously dominated by Tunisie Telecom. It followed the example of its competitor, offering specific offers responding more to companies' needs.

It should be mentioned that on the fixed-line level, the third operator, which obtained its licence in 2009, became operational in May 2010.

On the plan of market segmentation according to technology, the two operators use the GSM standard for mobile telephony.



## Internet

There are 12 Internet service providers (ISP). Seven (ATI, CCK, INBMI, CIMSP, IRESA, Jeunesse & Sport, Ministry of Defence) are public, and five (Planet Tunisie, 3S-Globalnet, Topnet, TuNet, Hexabyte) are private. The ATI provides state-of-the-art national Internet exchange functions and the international connection. ISPs are treated on equal footing no matter their size. The ATI is also an Internet service provider for public administration. This latter function is being transferred to the Centre National Informatique (CNI).

Each public ISP is linked to a ministry. Its clients are the supervisory ministry and the administrative organisations that are linked to it:

- CCK: Ministry of higher education, scientific research and technology
- INBMI: Ministry of National Education
- CIMSP: Ministry of Public Health
- IRESA: Ministry of Agriculture
- Jeunesse & Sport: Ministry of Youth, Sport and Physical Education
- ISP of the Ministry of National Defense.

Public institutions generally pay a subscription to get public ISP services. Thus, civil servants, students and scholars receive a free subscription.

Private ISPs that are private companies do not have restrictions on their service offerings. They can, therefore, serve private or public clients.

Internet access infrastructures depend directly on the telecommunication operators, notably on Tunisie Telecom. All ADSL links and dedicated lines are directly managed by Tunisie Telecom. Wimax and satellite links are managed by Tunisie Telecom and Divona. The GPRS networks are managed by Tunisie Telecom and Tunisiana. 3G access will be provided in 2010 by Orange Tunisie, the new operator.

Current public and private ISPs only intervene in a single link in the value chain in the case of distribution to the general public and companies.

The ISP landscape will experience changes when Orange Tunisie starts business operations. It will also intervene in the capacity of Internet Service Provider.

ISP clientele segmentation is performed on the basis of the distinction between the general public and professionals. Within each segment, the apportionment is done on the basis of prices and speed. Speed offers are set by the telecommunications operators. The speed offer has been increasing regularly for the past two years.

## Radio and Television Broadcasting

The Office National de Télédiffusion (ONT) broadcasts of radio and televised programmes in Tunisia exclusively.

There are nine public radio stations:

- the national radio channel in Arabic ;
- the international radio channel ;
- the youth radio channel ;
- the cultural radio channel ; and
- regional channels: Sfax, Monastir, Gafsa, le Kef and Tataouine

There are three private channels: Mosaique FM, Jawhara, and Zitouna FM.

The regional channels and two of the private channels are limited in terms of coverage.

As far as content is concerned, two channels are specialized; one in the cultural field (cultural radio channel) and the other in the field relation to religion (Channel Zitouna). The other channels are non-specialised.

As for the audience, all the channels target the whole population except for the "youth radio" channel, which has chosen to address its programmes to the youth category.

The different channels broadcast in Arabic except for the international channel, which broadcasts its programmes in French, English, Italian, Spanish and German.

The television broadcasting landscape consists of two public television channels (TV7 and Canal 21) and two private channels (Hannibal TV and Nessma TV). The programmes of the television channel Rai-Uno are re-broadcast across the Tunisian territory.

TV7 is broadcast in analogue on the Tunisian terrestrial network and digitally via the satellites

Eutelsat W2, Hotbird 8, Badr 6, Nilesat 104 and Galaxy 19 for the regions of North Africa, Europe, the Middle East, North America, Canada and Mexico. TV7 is also broadcast via the Internet.

Canal 21 and Hannibal TV are broadcast on the terrestrial network and via satellite while Nessma TV is only broadcast via satellite.

The coverage rates are:

- TV7: 99.8 % of the population
- Canal 21: 99.6%
- Hannibal: 44.8 %
- Rai-Uno: 68%

## Analysis of Annual Reports, Ratios, Investments, Employees, Incomes and the Number of Subscribers

### Telecommunications

Tunisie Telecom underwent partial privatization in 2006. The consortium Emirati TeCom-DIG bought up 35% of TT's capital.

The turnover of the incumbent operator increased from 1212 MDT to 1265 MDT between 2007 and 2008. Its workforce consisted of 8,300 employees in 2008. The evolution of the number of subscribers is shown in the table below.

**Table 7: Evolution of the number of fixed-line telephone and mobile telephone subscribers of Tunisie Telecom between 2005 and 2008**

	2005	2006	2007	2008
Number of subscribers on the fixed line telephone network (in thousands)	1 257	1 268	1 273	1 239
Number of subscribers on the mobile telephone network (in thousands)	3 423	4 270	4 191	4 313

Source: 2006 and 2008 INT Report

The evolution of subscribers on the different data transmission networks unfolded as indicated in the table below.

**Table 8: Evolution of subscribers on different data transmission networks**

Indicators	2005	2006	2007	2008	July 2009
DL	4 464	4 891	5 173	4 475	4 239
X25	1 842	1 026	491	311	112
ISDN	2 192	2 614	2 186	2 972	2863
ADSL	16 491	45 543	114 166	212 489	292 216
Frame Relay	4 555	5 453	6 336	7 144	7 422
<b>TOTAL</b>	<b>29 544</b>	<b>59 527</b>	<b>128 352</b>	<b>227 391</b>	<b>306 852</b>

Source: <http://www.infocom.tn/index.php?id=148>

## Tunisiana

Tunisiana is a limited company created in 2002. It is part of the ORASCOM group. Its social capital is 359,172 million Dinars. Its turnover increased from 682,553 MDT in 2007 to 891,000 MDT in 2008.

Tunisiana's main indicators are mentioned in the table below.

**Table 9: Main financial indicators of Tunisiana**

Financial Data	December 2005	December 2006	December 2007	December 2008
Revenues (US\$000)	320,990	456,071	558,616	724,091
EBITDA (US\$000)	121,506	224,515	278,303	378,383
EBITDA Margin	37%	49.2%	49.8%	52.3%
Capex (US\$ m)	106	90	76	99

Source: ORASCOM 2006 and 2008 Annual Reports ([http://www.orascomtelecom.com/Investor\\_Relations/pdfs/OT%20Annual%20Report%202008.pdf](http://www.orascomtelecom.com/Investor_Relations/pdfs/OT%20Annual%20Report%202008.pdf))

The number of subscribers increased from 2,258,000 in 2005 to 4,257,000 in 2008 as indicated in the table below.

**Table 10: Evolution of the number of mobile telephone subscribers of Tunisiana between 2005 and 2008**

	2005	2006	2007	2008
Number of subscribers on the mobile telephone networks (in thousands)	2 258	3 069	3 652	4 257

Source: 2006 and 2008 INT Report

The table below presents the number of prepaid and post-paid subscribers and market share according to the ORASCOM report.

**Table 11: Evolution of market share and the number of prepaid and post-paid mobile telephone subscribers of Tunisiana**

Operational Data	December 2005	December 2006	December 2007	December 2008
Subscribers	2,257,662	3,069,314	3,651,813	4,256,573
Prepaid	2,228,638	3,027,761	3,601,102	4,177,092
Post-paid	29,024	41,553	50,711	79,481
Market Share	42.8%	46.5%	47.7%	51.1%
ARPU (US\$) (3 months)	12.5	13.3	14.3	12.7
MOU (YTD)	129	132	135	158
Churn (YTD)	23.7%	40.7%	7.6%	8.0%

Source: ORASCOM 2006 and 2008 annual report

## Internet

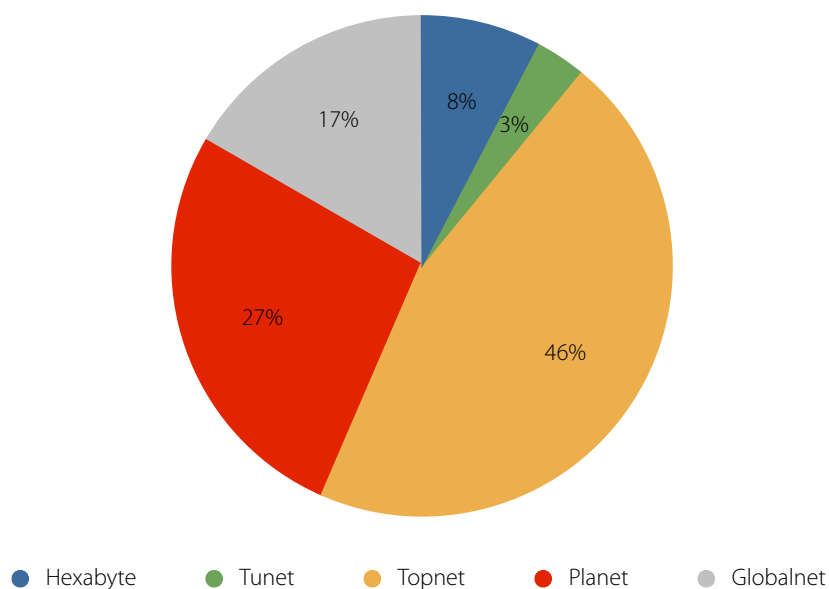
The number of ADSL subscriptions at private ISPs nearly doubled between 2008 and 2009, increasing from 178,500 to 354,000. It is projected to reach a million new subscribers on the high-speed Internet network by 2014. All of the ISPs benefitted from this growth, which partly explains the drop in subscription prices. The state pushed the ISP and Tunisie Telecom over and over again to revise their prices downwards.

**Table 12: Distribution of ADSL subscriptions between private ISP**

	ADSL Sales at 31.12.2008	ADSL Sales at 15.12.2009
Topnet	72 000	162 000
Planet	51 000	95 000
Globalnet	32 000	59 000
Hexabyte	16 000	27 000
Tunet	7 500	11 500
<b>Total</b>	<b>178 500</b>	<b>354 500</b>

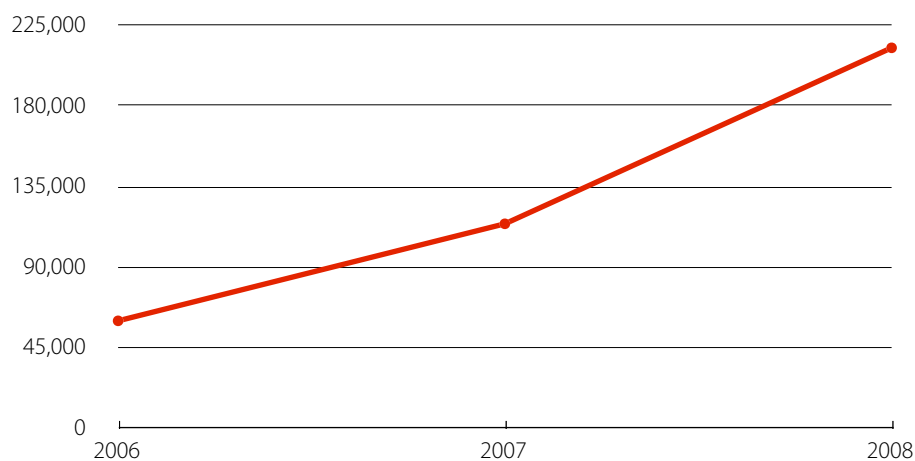
Source : <http://www.africanmanager.com/articles/125807.html#>

Topnet and Planet have kept their respective positions as first and second ISPs in the Tunisian market.



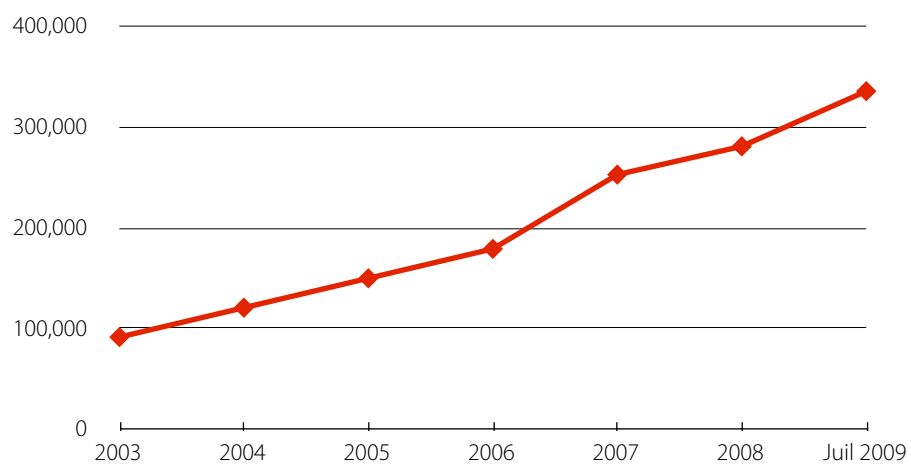
**Figure 8: Distribution of ADSL subscriptions per ISP in % (15/12/2009)**

The evolution of the total number of high-speed subscribers to private and public ISP are represented in figure 9.



**Figure 9: Number of subscribers to high-speed Internet (broadband) (ITU data)**

The evolution of the number of Internet subscribers (high speed and low speed) is presented in figure 10.



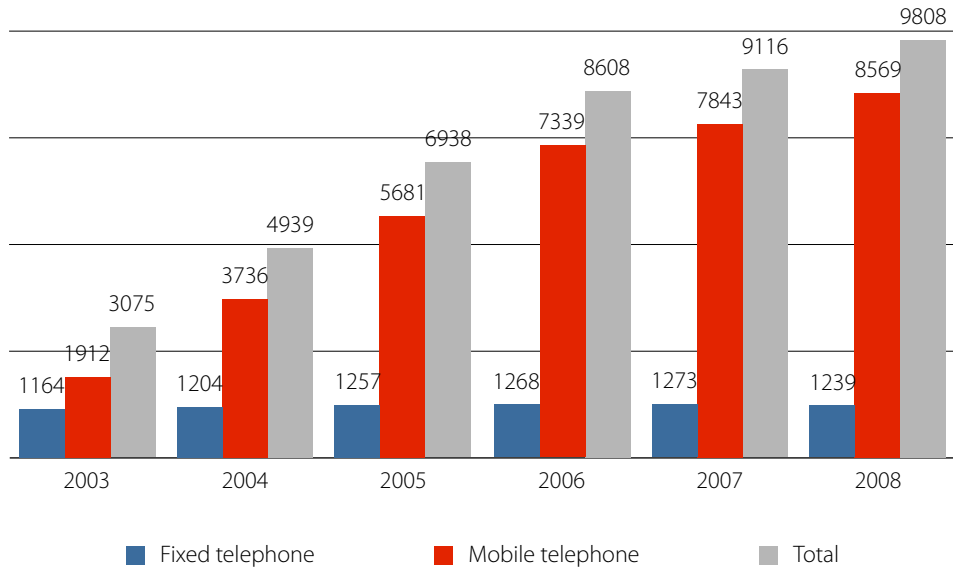
**Figure 10: Number of Internet network subscribers**

Source: <http://www.infocom.tn/index.php?id=165>



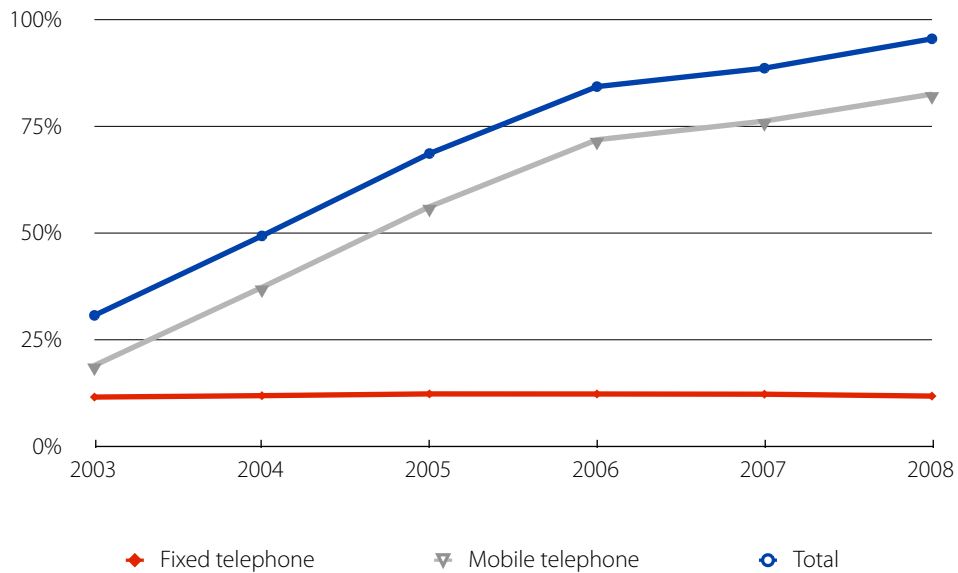
## Network Development and Infrastructure

Telecommunication infrastructures experienced strong development during the past decade. This is proven by the growth in the number of subscribers to the telephone network (cf. figure below).



**Figure 11: Evolution of the number of subscriptions to fixed-line and mobile telephones in Tunisia until the end of 2008 (in thousands)**

Source: INT Report, 2008



**Figure 12: Evolution of the penetration rate of fixed and mobile telephones (number of subscriptions/100 inhabitants) until the end of 2008**

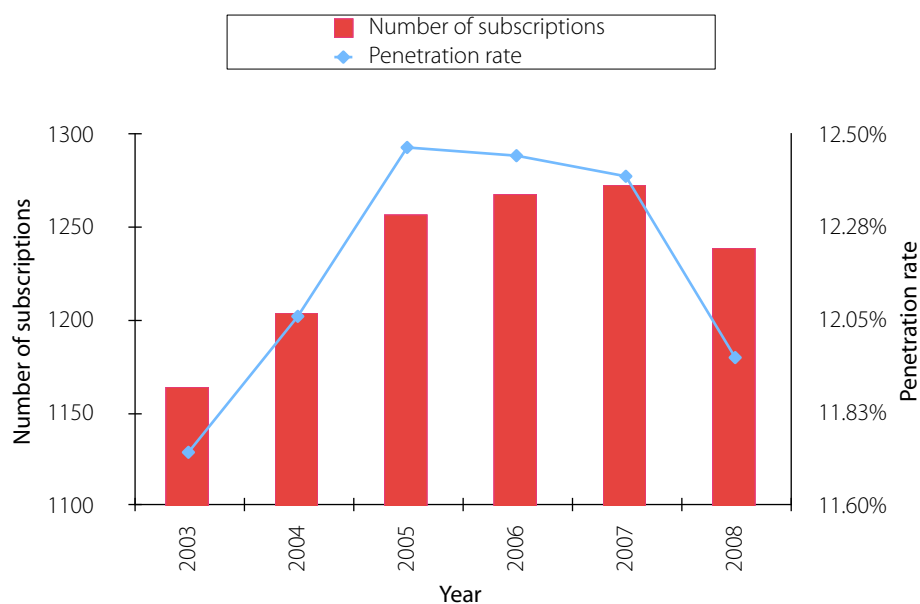
Source: INT Report, 2008

The population coverage rate by fixed-line and mobile telephones was about 99% in 2009.

### Fixed Landline and Wireless Telephones

The fixed line telephone penetration rate experienced growth until 2007 and decreased in 2008, dropping from 12.4% to 11.96% as indicated in the curve below.

*The population coverage rate by fixed line and mobile telephones was about 99% in 2009*



**Figure 13: Evolution of the number of subscriptions of fixed line telephones and the penetration rate until the end of 2008**

Source: INT Report, 2008

The telephone transmission network is completely digitized and contains more than 10,000 km of fibre optic cables. It consists of various international connections, satellite stations and underwater cables (cf. Figure below).



**Figure 14: Configuration of international connections**

Source: Neji, 2009

Three underwater cables provide international connections:

- the Keltra cable, with a capacity of 10 gigabytes/second, linking Kélibia to Trapani
- the Sea-Me-We-4 cable linking Bizerte to Marseille and Palermo
- the Hannibal cable with a total capacity of 3.2 terabytes/s linking Kélibia to Mazara. It belongs to Tunisie Telecom.

Tunisie Telecom has more than 600 digital telephone switches. The list of open switches is available in Tunisie Telecom's interconnection catalogue.

The connection of subscribers to switching centres is provided by local copper cable networks.

Rural areas or areas that are difficult to access are served by WLL networks.

Tunisie Telecom launched fibre optic access projects in more than 50 business districts.

Tunisie Telecom planned two phases in the development of VoIP:

- the first phase is designed for multi-site key account clients
- the second phase is designed for the generalization of VoIP (Belhassine-Cherif,2008).

Regulation (Decree of 21 July 2008) stipulates that public telecommunication network operators provide the VoIP service to the profit of:

- call centres ;
- companies whose activities are based on communication technology ;
- administration and economic companies who have multiple sites and branches ; and
- international authorities and organization established in the Tunisian Republic

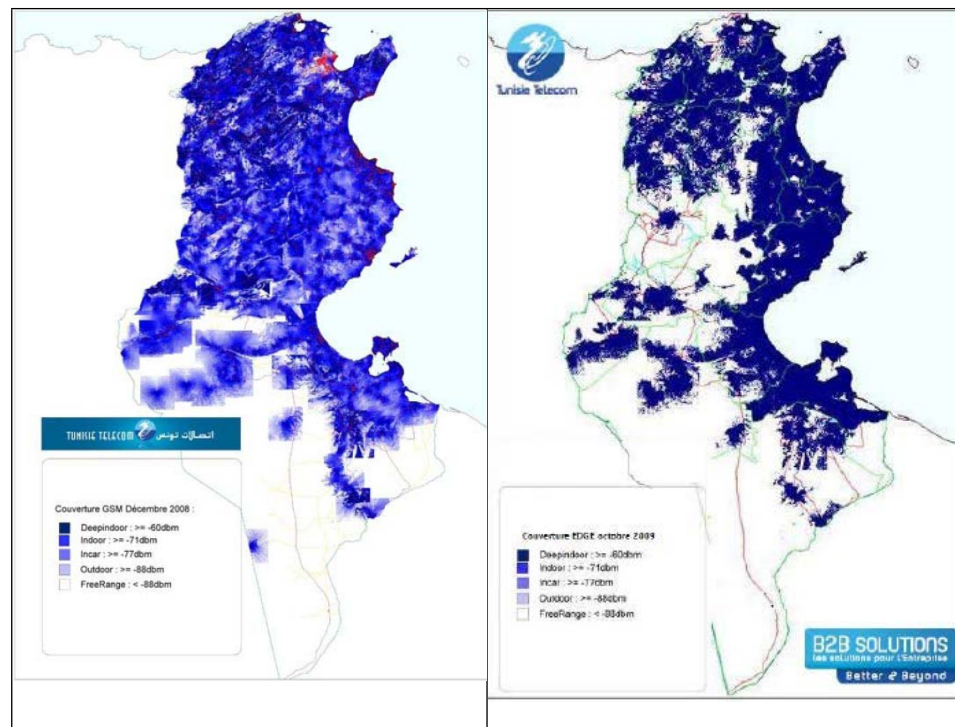
Telecommunication operators also provide this service to the benefit of their clients in the framework of authorised offers.

### Mobile

Mobile telephone operators, as described above, share VoIP and Data services according to GSM, GPRS and EDGE standards. The third operator, which started its activities in May 2010, offers 2G and 3G mobile services.

It should be mentioned that the number of mobile telephone subscribers increased from 5,681,000 in 2005 to 8,569,000 in 2008.

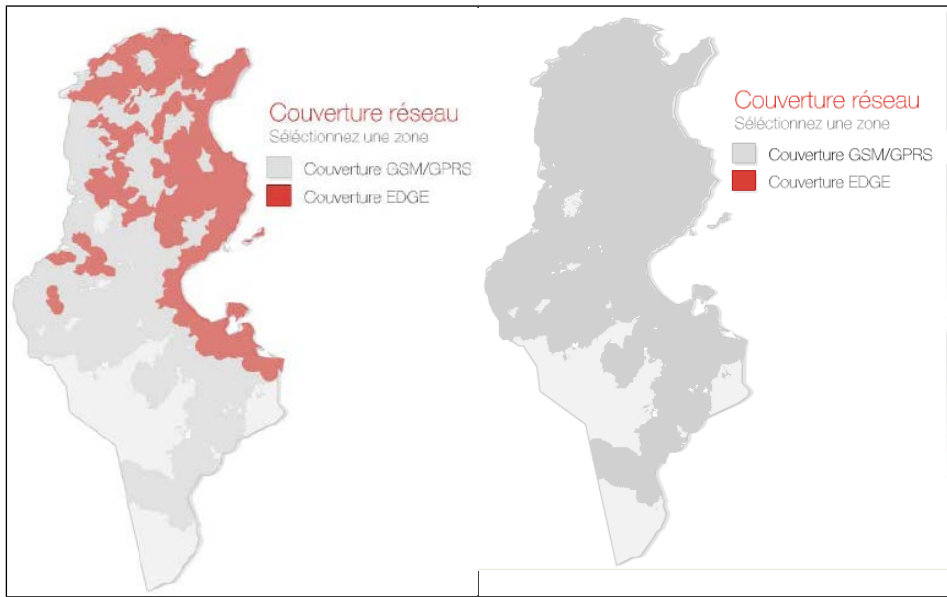
The territorial GSM and EDGE coverage of Tunisie Telecom and Tunisiana is indicated on the maps below.



**Figure 15: Territorial GSM and EDGE coverage of Tunisie Telecom**

Source : [http://www.tunisiatelecom.tn/tt/internet/fr/couverture\\_reseau/couverture\\_gsm](http://www.tunisiatelecom.tn/tt/internet/fr/couverture_reseau/couverture_gsm)  
[http://www.tunisiatelecom.tn/tt/internet/fr/couverture\\_reseau/couverture\\_edge\\_mobile](http://www.tunisiatelecom.tn/tt/internet/fr/couverture_reseau/couverture_edge_mobile)

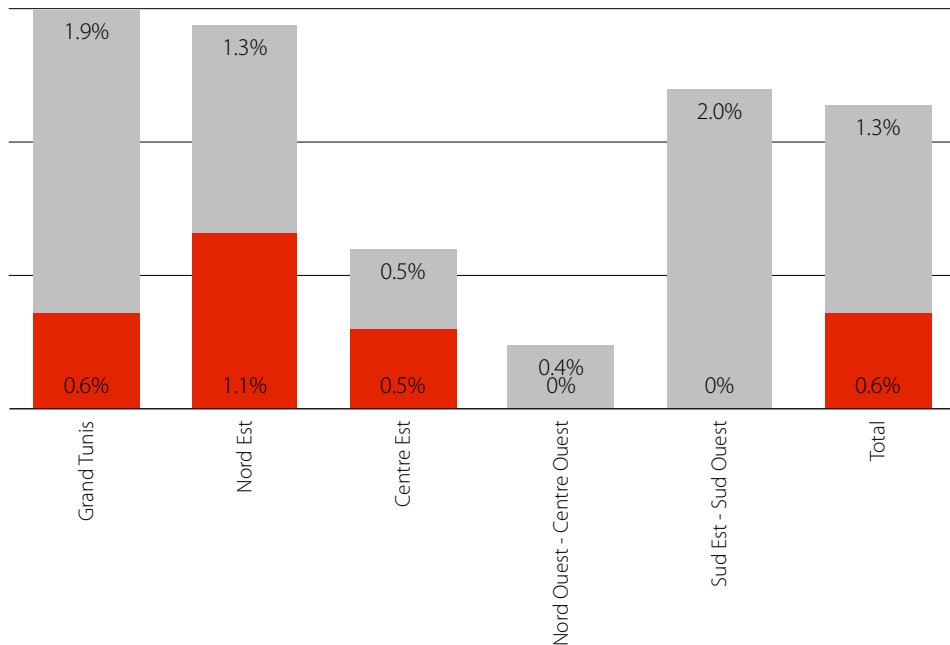
Tunisie Telecom increased the capacity of the Radio mobile network by 10% and improved its network congestion rate, which went from 16% in 2008 to 0,5% at peak time in 2009 (Business News, 31/12/2009 <http://www.businessnews.com.tn/BN/BN-lirearticle.asp?id=1088655>). Also, the interruption rate was reduced from 1.1% in 2008 to 0.8% in 2009 (Business News, 31/12/2009). It should be noted that the international standard is 1%.



**Figure 16: Territorial GSM/GPRS coverage of Tunisia**

Source :[http://www.tunisiana.com/jahia/Jahia/cache/offonce/Tunisiana/couverture\\_reseau%3Bjsessionid=88DC8E762A6C2A414F4DB66F4223C3CA](http://www.tunisiana.com/jahia/Jahia/cache/offonce/Tunisiana/couverture_reseau%3Bjsessionid=88DC8E762A6C2A414F4DB66F4223C3CA)

The measures carried out by the INT on service quality using the minimum and maximum voice interruption rate per region for the two mobile telephone networks, SMS service quality, as well as MMS service quality per region (according to the different service quality indicators for the two mobile telephone networks) reveal a good overall quality as shown by the following three figures.



**Figure 17: Distribution of minimum and maximum interruption rates per region for the two mobile telephone networks in Tunisia**

Source: INT Report, 2008

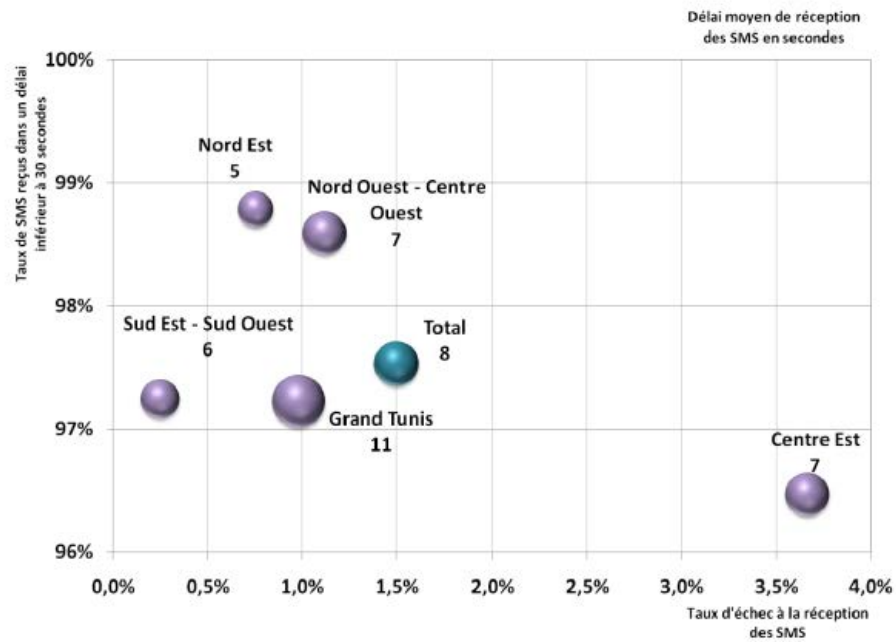


Figure 18: Rate of SMSs received in less than 30 seconds in relation to the reception failure rate per region for the two mobile telephone networks in Tunisia

Source: INT Report, 2008

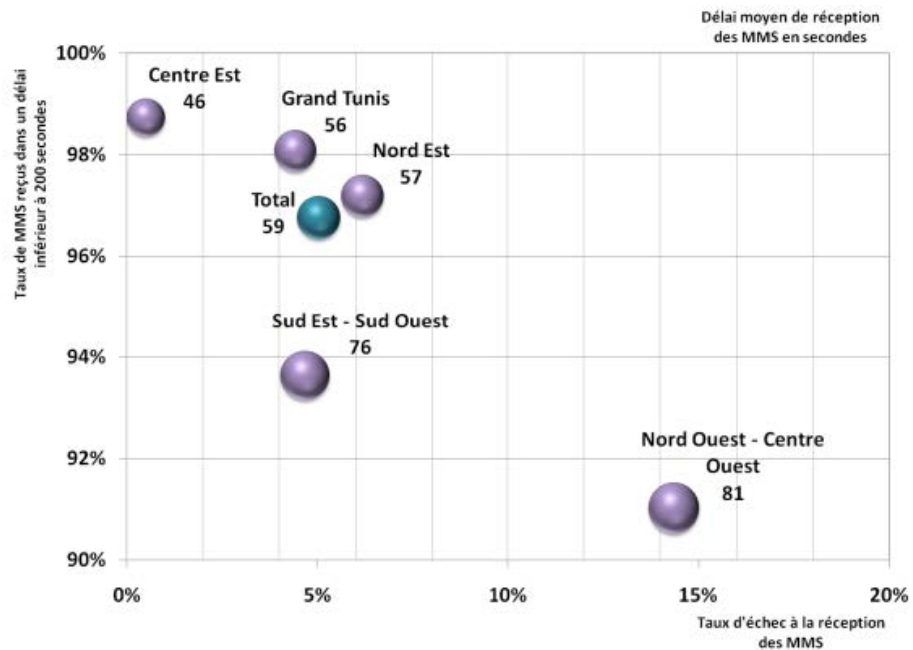


Figure 19: Rate of MMS received in less than 200 seconds in relation to the reception failure rate per region for the two mobile telephone networks in Tunisia

Source: INT Report, 2008

The value added service (VAS) in Tunisia is still in the start-up phase. The three major types of value added services in Tunisia are:

- voice value added services (audio phonic) ;
- SMS based value added services ;
- Internet value added services (web hosting, email hosting, etc.)

Their development is supported by incentive measures. It is expected that the commencement of operations of the third operator with 3G services will give an impetus to value-added services.

## Broadband

There are 12 ISP of which five are private. As indicated above, Internet access infrastructures depend directly on telecommunication operators and notably on Tunisie Telecom. All the ADSL connections and dedicated lines are directly managed by TT. Wimax and satellite connections are managed by TT and Divona. GPRS networks are managed by Tunisie Telecom and Tunisiana. The 3G infrastructure was rolled out in May 2010 by Orange Tunisie.

The Internet access networks of Tunisie Telecom uses two different technologies:

- ATM (Asynchronous Transfert Mode), which offers a limited speed ; and
- Gigabyte Ethernet, the most recent technology, which offers faster speeds

Tunisie Telecom launched the deployment of fibre optic networks to provide FTTB (Fibre to the Building) services for companies in more than 50 business districts as mentioned above.

Tunisie Telecom has successfully increased the capacity of the international Internet bandwidth, particularly in 2007. In fact, the bandwidth increased from 1.28 Gbps in 2006 to 8.75 Gbps in 2008, to 15 Gbps in May 2009. In September of the same year, the bandwidth increased to 17.5 Gbps after the activation of an SMW4 underwater cable via Marseille. This solution has allowed diversifying the international IP bandwidth more using three different routes:

SMW4 via Marseille, SMW4 via Palermo and Keltra (Kélibia-Trapani) (cf. Figure 14 underwater cables). In November 2009 a new increase of an additional 10 Gbps was enabled via the new Tunisie Telecom cable, Hannibal, to reach 27.5 Gbps (<http://www.tunisiait.com/article.php?article=4358>).

The evolution of subscribers to data transmission networks (DL, X25, ISDN, ADSL, Frame Relay) was already presented in Table 8 of the present report.

## Radio and Television Broadcasting

All the radio channels (five public and three private) broadcast on frequency modulation. Only the national radio station broadcasts its programmes at the same time on short wave, medium wave and frequency modulation in addition to via satellite. All the non-regional public channels cover between 97 and 100% of the total population. The coverage rates and the broadcasting modes are summarized in the table below (ONT, <http://www.telediffusion.net.tn/index.php?tv>).

**Table 13: Radio channels, broadcasting modes and coverage rates.**

Radio Channels	Broadcasting				Coverage	
	Short Wave	Medium Wave	Frequency Modulation	Satellite	% population	Other
National Radio	X	X	X	X	100 %	
International Radio "RTCI"			X	X	86%	
Youth Radio			X		98%	
Cultural Radio RC		X	X		97%	
Five Regional Radio Channels : Sfax, Monastir, Gafsa, Le Kef and Tataouine						Regional network
Private Radio Mosaïque FM			X		Greater Tunis and Cap Bon	
Private Radio Jawhara			X		East Central and the Sahel region	
Private Radio Zitouna FM			X		100%	Satellites "Arabsat BADR6" and "NILESAT 104"

*Tunisie Telecom launched the deployment of fibre optic networks to provide FTTB (Fibre To The Building) services for companies in more than 50 business districts as mentioned above*

*Bandwidth increased from 1.28 Gbps in 2006 to 8.75 Gbps in 2008, to 15 Gbps in May 2009. In September of the same year, the bandwidth increased to 17.5 Gbps after the activation of an SMW4 underwater cable via Marseille. In November 2009, a new increase of an additional 10 Gbps was enabled to reach 27.5 Gbps*

The Tunisian television channels all broadcast in analogue and digital except for the private channel Nessma TV, which only broadcasts its programmes digitally. The coverage rate of national public channels and Canal 21 are respectively 100% and 99.6% (ONT, <http://www.telediffusion.net.tn/index.php?tv>).

**Table 14: Television channels, broadcasting modes and coverage rates**

Television Channel	Broadcast	Coverage in % of the Population
National television channel TV7	– in analogue on the VHF/UHF terrestrial networks – in digital on the Eutelsat W2, Hotbird 8, Badr 6, Nilesat 104 and Galaxy satellites 19.	99.8 % in analogue on the terrestrial network.
The youth channel Canal 21	– in analogue on the UHF terrestrial networks – in digital on the Badr 6 et Nilesat 104 . satellites	99.6 % in analogue on the terrestrial network
The private television channel Hannibal	– in analogue on the UHF terrestrial networks – in digital on the Nile Sat et Arab Sat satellites	44.8 % on the terrestrial network.
The private television channel Nessma	– in digital on the satellites Nile Sat et Arab Sat satellites	
The Italian television channel RAI-UNO	in analogue on the UHF terrestrial networks	68 % on the terrestrial network

Tunisia took up the implementation of terrestrial digital television. The first phase started in 2001. From 2009 to 2010, the infrastructure to be implemented is aimed at coverage of all the regions of the country by 2014.

## Pricing

Pricing will be examined for the fixed-line, mobile and Internet sectors. The fixed-line rates are set by the Ministry of Communication Technology. Mobile telephone rates are proposed by operators to the regulator who is in charge of validating their proposals. For the Internet, rates are decided at the ministerial level and the regulation authority does not intervene at this level.

All the services are subject to VAT. The VAT rate applied to telecommunications is 18%. It is 12% for IT and Internet services.

### Fixed Lines

The incumbent operator currently holds the monopoly on fixed lines.

There are four main services: post-paid, prepaid, mobirif post-paid and mobirif prepaid. In the following table, we will only resume the rates relating to the first two services. The rural telephone service Mobirif (mobile-fixed line) is, thus, not taken into consideration due to the very low proportion of the number of subscribers.

The time slots for applying reduced rates (off-peak hour rates) are the following:

- Monday to Sunday from 8pm to 7am
- Sunday the whole day

The normal rate (peak hour rate) is applied during other time slots.

**Table 15: Fixed-line telephone rates**

Name of Operator	Tunisie Telecom	Tunisie Telecom
Product name		
Postpaid =1, Prepaid =2	Postpaid (DT)	Prepaid
Monthly telephone subscription cost for post paid	2.667	
Cost of a local 1 minute call (off off peak rate)		
Cost of a local 1 minute call (off peak rate)	0.010	0.011
Cost of a local 1 minute call (peak rate)	0.010	0.015
Cost of a national 1 minute call (off off peak rate)		
Cost of a national 1 minute call (off peak rate)	0.070	0.070
Cost of a national 1 minute call (peak rate)	0.100	0.100
Cost of a 3 minute call to US (off peak rate)	0.750	0.750
Cost of a 3 minute call (off peak rate) to main trading partner, specify: France	0.750	0.750
Cost of a 3 minute call (off peak rate) to Neighbouring country 1, specify: Algeria	1.020	1.020
Cost of a 3 minute call (off peak rate) to Neighbouring country 2, specify: Libya	1.020	1.020
Cost of a 3 minute call (off peak rate) to Neighbouring country 3, specify: Italy	0.750	0.750
Type of billing (Per second, minute other intervals)	per minute	per minute

### Mobile

The following table shows the standard rates. Promotions and once-off rates are not taken into account. The prices indicated correspond to the month of September–October 2009.



**Table 16: Mobile telephone rates**

Product Name		Mobile post-paid = 1	Mobile prepaid =2	Mobile post-paid = 1	Mobile prepaid =2
Operator Name		Tunisie Telecom	Tunisie Telecom	OTT-Tunisiana	OTT-Tunisiana
Billing info: per second, 30 seconds, minute, per second after first minute etc			15 s		
Free Minutes (on-net or off-net)					
Free SMS or other benefits (on-net or off-net)					
Fixed-wireless =1, Mobile =2		2	2	2	2
Technology used		GSM, GPRS, EDGE	GSM, GPRS, EDGE	GSM, GPRS, EDGE	GSM, GPRS, EDGE
On-net	Peak	0.145	0.180	0.140	0.160
	Off Peak	0.120	0.180	0.140	0.160
	Off Off Peak				
Off-net	Peak	0.180	0.225	0.200	0.225
	Off Peak	0.150	0.225	0.200	0.225
	Off Off Peak				
Cell to fixed line	Peak	0.180	0.225	0.200	0.225
	Off Peak	0.150	0.225	0.200	0.225
	Off Off Peak				
Off Peak International Call	Neighboring Country 1 Alegria:	0.340	0.340	0.380	0.380
	Neighboring Country 2 Libye:	0.340	0.340	0.380	0.380
	Neighboring Country 3 Italie:	0.500	0.500	0.540	0.540
	USA	0.500	0.500	0.540	0.540
	Main trading partner, France:	0.500	0.500	0.540	0.540
SMS	On-net	0.050	0.050	0.050	0.050
	Off-Net	0.050	0.050	0.050	0.050
SMS International		0.150	0.150	0.150	0.150
Monthly subscription					
3G DATA PER MB AND 2.5 G EDGE OR GPRS				4.000	4.000

The difference between operator rates is rather insignificant. In their differentiation policy, operators prefer to play more on the rates of specific products designed for a priori defined segments of the market.

To compare the rates with international rate practices, the RIA refers to the basket benchmarking method of the OECD, which compares mobile telecommunication service rates between the countries of the OECD. The method only uses the data of dominant operators who together have at least 50% of the market. RIA compares the rates of all the operators whether they are dominant or not. On this basis, RIA calculates the least expensive rate available, which it compares to the lowest rate of the prepaid product of dominant operators. The difference between the two rates, the least expensive and the least expensive of all the dominant operators, is interpreted as competitive pressure in the sector and can be linked to the market structure and regulatory environment.

**Table17: Basket of prepaid mobile telecommunication rates in Tunisia according to the RIA and OECD benchmarking methods**

	Cheapest Low User	Cheapest Medium User	Cheapest High User
According to the RIA calculation method			
In DT	6,531	13,210	26,048
In US\$	5,06	10,24	20,19
In US\$ PPP	10,53	21,31	42,01
According to the OECD calculation method			
In DT	6,531	13,210	26,048
In US\$	5,06	10,24	20,19
In US\$ PPP	10,53	21,31	42,01

The table above does not bring to light any differences in the results between the two methods due to the fact that the mobile telecommunication market is shared in a nearly equal manner between the only two mobile telephone operators in the Tunisian market that exist at the time of the survey.

## Internet

The Internet connection and subscription rate is made up of two parts. One part is paid to the service provider and the other part is paid to Tunisie Telecom for the connection fees. ISP rates are rather similar. Moreover, the speed increase offers are frequent and accompanied by rate reductions. The data indicated in the table below was collected in September 2009.

**Table 18: Internet connection and subscription rates**

Infrastructure	Tunisie Telecom	Divona					
Name of ISP			Global Net	Hexa Byte	Planet	Topnet	Tunet
International Bandwidth of ISP (Capacity)	15 gigabits/s						
No of modem Dial-up subscribers	45 000						
No of ADSL subscribers	268 000						
No of wireless broadband subscribers		1600					
Price per month for 1 GB cap a month download							
Price per month for 5 GB cap a month download							
Flat Annual rate unlimited in TD	512K: 180; 1Mbs:240; 2Mbs: 360		512K: 99; 1Mbs: 148,500; 2Mbs: 198	512K: 99; 1Mbs: 159; 2Mbs: 199	512K: 120; 1Mbs: 168; 2Mbs: 240	512K: 99; 1Mbs: 149; 2Mbs: 199	512K: 99; 1Mbs: 129; 2Mbs: 199

Monthly Narrow band subscription							
No of leased line subscribers by size (32k, 64, 128, 256, 512, 1MB,..... (data : 2008)		DL : 4475 X25 : 311 ISDN : 2972 Frame Relay : 7144					
ISDN or modem dial-up	Peak per minute	0.010					
	off peak rate per minute	0.010					
	Monthly subscription	22,302					

## Interconnection

**Table 19: Interconnection rates in DT**

		Termination Rates
Mobile to Mobile	Peak	0.100
	Off Peak	0.069
Mobile to Fixed	Peak	0,038
	Off Peak	0,026
Fixed to Mobile	Peak	0.100
	Off Peak	0,069
International to Mobile	Peak	
	Off Peak	
Mobile to International	Peak	
	Off Peak	
International to Fixed	Peak	
	Off Peak	
SMS		0,02
MMS		0,075

## Human Resources

The government has undertaken an ambitious programme to train ICT specialists. This programme has increased the total number of students specializing in ICT to more than 13% of the total number of students in the public sector. The following table shows the evolution of the number of ICT students.

*The government has undertaken an ambitious programme to train ICT specialists*

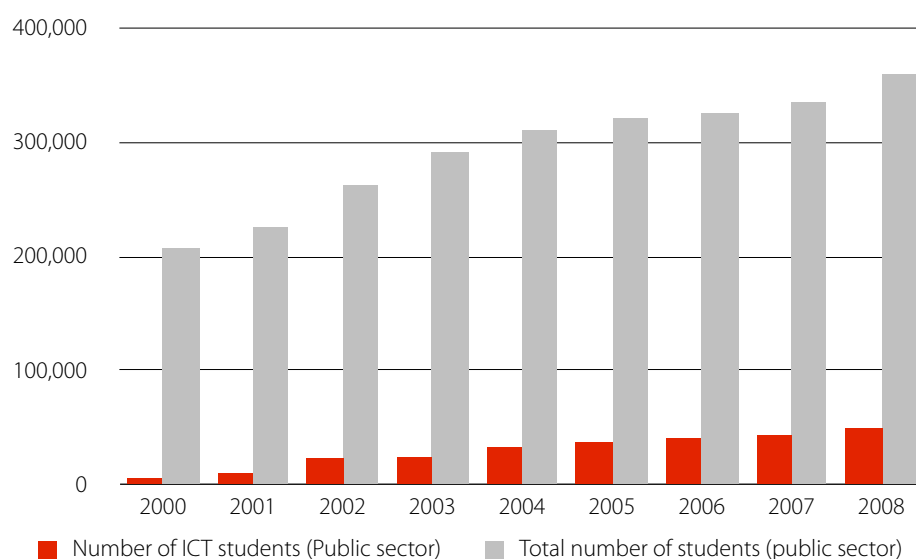
**Table 20: Number of ICT students**

Academic Year	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09
Number of ICT students (Public sector)	6 141	10 647	23 817	24 293	33 309	37 372	41 117	44 009	49 846
Number of ICT students (Private sector)							1 217	1 491	2 309
Total number of ICT students							42 334	45 500	52 155
Total number of students (Public sector)	207 388	226 102	262 502	291 842	311 569	321 838	326 185	335 649	360 172

Source: SEI

Most universities, public and private establishments, have ICT specialist training in the engineering faculties or schools. The qualifications issued are those of higher technician, bachelor's degrees, engineering, masters and doctorate degrees. The total number of graduates in 2008 was 9,790. The figure below shows the evolution of the number of students and ICT students between 2000 and 2009.

A significant investment was also made in research development. This has led to the creation of a certain number of research centres, laboratories and units dedicated to research in the field of ICT calling for about 2,000 researchers.



**Figure 20: Evolution of the total number of students and the number of ICT students**

Source: [http://www.mes.tn/indicateurs/indicateurs2008\\_fr/indicateur2008\\_fr.htm](http://www.mes.tn/indicateurs/indicateurs2008_fr/indicateur2008_fr.htm)

**Table 21: Evolution of the number of ICT graduates from public and private universities**

<b>Years</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Number of graduates (Public sector)	1231	1816	2407	4524	6507	7813	7938	9568
Number of graduates (Private sector)						199	235	222
<b>Total</b>	<b>1231</b>	<b>1816</b>	<b>2407</b>	<b>4524</b>	<b>6507</b>	<b>8012</b>	<b>8173</b>	<b>9790</b>

Source: SEI

A training plan in view of ICT certification was drawn up in 2009 and aims to certify 20,000 people over a period of five years. This plan aims for the certification and development of software, databases, operating systems, project management and network administration in view of fulfilling and promoting offshore activities in the ICT sector.

## Main IT Applications

IT applications in Tunisia were initiated since the beginning of the 1980s. The IT strategy is documented in the five-year IT plans integrated in the different economic and social development plans. Significant progress was made on the level of the different economic sectors.

Next, the IT applications that had a significant impact will be set out. This presentation takes the following outline:

- e-government applications with their three G to G, G to B and G to C types ;
- applications in diverse economic sectors ; and
- the radio and information sector

### e-Government Applications

The development of e-government applications is essentially carried out in three phases:

- Phase I (1980-1990's). This phase is characterized by the computerization of the main administrative functions and the development of main national applications ;
- Phase II (1990-2003). During this phase the spotlight was on the development of communicating administration ;
- Phase III (2003-2009). During this phase, the emphasis was on the strengthening and development of existing applications in relation to technological transformations as well as the implementation of priority projects in the field of e-administration and drawing up a 2010-2014 strategic plan ;
- Phase IV (2010-2014). Implementation of the e-administration strategic plan. The 2010–2014 strategic plan entails the development of 200 online public administration services.

The main applications are classified according to their recipients in the table below:

**Table 22: The main e-government applications**

Applications	Government	Companies	Citizens / Clients
State personnel management (INSAF)	X		
Budget Decision Process (ADEB)	X		
Monitoring and Management of Foreign Travel Orders (RACHED)	X		
Public Debt Management (SIADE)	X		
National Civil State System (MADANIA)			X
Government online portal (Baouba)		X	X
Administrative Information and Communication System (SICAD)		X	X
Income tax returns (RAFIK)		X	X
Electronic income tax returns (e- t@srih)		X	X
Customs IT systems (SINDA)		X	X
TradeNet online foreign trade procedures (single bundle)		X	

In addition to these national applications, other sectoral applications were developed and implemented. The main applications are indicated in the table below.

**Table 23: The main sectoral applications**

Applications	Companies	Citizens / Clients
Construction of online companies	Business creators	
Online university enrolment		Students
Online university orientation		Students
Virtual University of Tunisia (UVT)		X
Virtual school (primary and secondary)		X
Employment	X	X
Electronic filing of salaries and payment of social security contributions	X	
Monitoring of the progress of health insurance claim forms (CNAM)		X
Follow-up of court cases	X	X
Online public markets	X	
Consultation of title deeds	X	X

It should be pointed out that the ministries and public organisations each have their own websites.

#### **Applications in Diverse Economic Sectors**

The best-known intra-sectoral application is that of interbank clearing. Besides this application, the majority of banks have implemented e-Banking applications designed for company and individual clients. The Post Office has developed such services for its financial activities following the example of banks. It also developed a multipurpose e-Dinar card for all online payments, money withdrawals and payment in shops equipped with electronic pay points. This card plays the role of an electronic purse. The Post Office also developed an online payment service for companies who have made an agreement with the Post Office to pay their bills (electricity and gas, water, telephone, ISP bills etc.).

As for social security, the social security fund developed various information and interaction applications with the insured party and employers, such as electronic filing of salaries and electronic payment of contributions to the national social security fund, the monitoring of the progress of health insurance claim forms and the consultation of pension payments.

Telecommunication companies and water, electricity and gas distribution companies developed their own applications following the online consultation and payment of bills.

Air and rail transport companies developed online reservation and purchase applications.

Numerous travel agencies developed systems of online hotel reservations, tickets, car rental and payment. Certain hotels developed online reservation and payment systems.

In other economic sectors such as real estate, services, industry or commerce, numerous companies developed online electronic commercial activities. Tunisia currently has more than 300 online shops.

However, few market services have been developed for mobile telephones.

#### **The Media and Information Sectors**

The main Tunisian dailies can be read on the Internet. Other electronic newspapers are developing on the Internet. This development gives dynamism to the information sector. The main national television and radio channels are broadcast on the Internet.

A few mobile services are beginning to emerge, such as real time match results, navigation services, mobile banking and school examination results.

## Conclusion

Tunisia has been involved in a volunteer ICT sector development policy since the 1980s. This policy has resulted in considerable development in infrastructure, human resources and IT applications. The development of the activity in this sector was at the origin of the emergence of numerous companies in the IT field and dominated by the state-owned telecommunication operator, which enjoyed a monopoly situation. The dynamic that this brought about allowed the sector a strong growth rate and to make an increasingly significant contribution to the national economy in terms of added values, job creation and FDI attraction.

This dynamic encourages public authorities to implement a regulatory and incentive environment conducive to speeding it up even more. It should be pointed out in passing that at the end of the 1980s Tunisia was involved in a structural adjustment plan making provision for the liberalization of various sectors. This liberalization touched the telecommunication sector after the signature of agreements with the WTO in 1997.

Consequently, the legal and regulatory framework had to be prepared to lead the liberalization of the telecommunication sector. For that purpose, the first telecommunication code, which established the partial privatization to new operators, was promulgated in 2001. This code anticipates the creation of various organisations including the telecommunications regulation authority (INT) as well as the Agence National de Fréquences, which were created in the same year.

The landscape is currently made up of various organisations preparing the ground for the development of the ICT sector and a rich regulatory framework, which has evolved since the promulgation of the telecommunication code of 2001.

Among the main transformations in the competitive environment, the following should be mentioned:

- the launch of a private operator in the mobile telephone sector in 2002 and an operator in the fixed-line and mobile telephone sector in 2010 ; and
- the partial privatization of the incumbent operator to investors, which ended in the 35% acquisition from a private shareholder.

The telephone offer and more particularly that of mobile telephones came at the right moment to respond to a latent need amongst economic role players and citizens. The strong mobile telephone penetration growth led to a density exceeding 100% in 2010.

Internet penetration development, even though it is significant, was weaker. The improvement of the international bandwidth capacity experienced a considerable increase over the past few years.

Despite the fact that the liberalization experience is relatively young (dating from the beginning of 2000), the gains are remarkable, particularly in the fields of skills development, job creation and a certain dynamic of the sector, which, with the entrance of the third operator will propel it into a new development stage with the diversification of the offer and innovative services.

After this first experience, a few lessons can be learned about regulation, the privatisation of Tunisie Telecom, the development of value-added services and service quality.

As for regulation, the reduction of organisations has led to the reduction of representatives for operators in the sector. It would be appropriate to think about the merger of certain institutions or the increase of prerogatives by others in order to reduce the number of opponents and to better use resources and skills.

As the new phase will be characterized by the rapid development of broadband Internet, the INT is called upon to play a more active role in this field to make better use of competition at the level of quality and prices. For that matter, the TRE survey enabled us to identify that service quality is the least well-perceived area. The improvement of service quality requires recurrent evaluations of mobile telephone, fixed-line telephone and Internet services in order to identify strengths and weaknesses. Once published, these evaluations can encourage operators to improve the quality of their services. The INT could, thus, ensure an information function, which helps operators to better position themselves and clients to better make their choices.

As for the partial privatization of Tunisie Telecom, the partnership was purely a financial partnership. The handover process of new capital shares of Tunisie Telecom is already under way. It would be appropriate for Tunisie Telecom to look for a technological partner in the sector in order to strengthen its technological capacity and to better confront the competition while planning the

*Tunisia has been involved in a volunteer ICT sector development policy since the 1980s. This policy has resulted in considerable development in infrastructures, human resources and IT applications*

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strengthening of the development of the company. The strengthening of the technological and innovative capacity of Tunisie Telecom will then be an asset from which to develop and launch value-added services. For that matter, the sector analysis enables us to reveal that the development of these services did not follow the same pace of growth as that of mobile telephones.

The telecommunication development funds of which the activity essentially focuses on the financing of the activities of the Tunisian Post Offices and the Office National de Télédiffusion and other ICT promotion activities can go further to finance other booming activities linked to broadband and to value added services.

Also, the universal service, which is limited to basic telephone services, can expand and add other services linked to the Internet, notably broadband.

## Appendix 1

### Main Events in Telecommunication Regulation

#### January 2008 – July 2009

January 2008	Amendment of the telecommunication code
13/05/2008	Decree no. 2008-1868 supporting the creation of a management unit by objectives for the execution of the digital economy development project and setting its organisation and the terms of its functioning
21 July 2008	Decree no. 2008-2639 setting the conditions and procedures of imports and marketing of encryption means or services through telecommunication networks
21 July 2008	Decree no. 2008-2638 setting the conditions of telephone service provision on Internet protocol
15 September 2008	Decree no. 2008-3025 supplementing decree 2001-831 of 14 April 2001, relating to the general interconnection conditions and the rates determination method
15 September 2008	Decree no. 2008-3026 setting the general conditions of the use of public telecommunication networks and access networks
December 2008	Implementation of an incubator dedicated to arbitrate online service projects
24 February 2009	Decree no. 2009-540 amending decree no. 2003-1249 of 2 June 2003, supporting the creation of a management unit by objectives for the execution of the national action plan in the field of free software and setting its organization and the terms of its functioning
July 2009	Act on the execution of the mega-project "Tunis Telecom city" in Kalaat Landalous (governorate of Ariana)
March 2009	New measures that concern value-added SMS and local call centres (4 pricing stages).
23 June 2009	Decree no. 2009-2019 amending decree no. 2007-1290 of 28 May 2007, setting the rules and procedures of closing partnership agreements in the field of the digital economy
July 2009	Granting of the 3rd Telecoms licence
17 August 2009	Creation of the Prize for digital excellence of the President of the Republic

## Appendix 2

### TRE Questionnaire

#### Telecommunications Regulatory Environment in Tunisia

Please make an evaluation of the telecommunications regulatory environment (TRE) for the period from January 2008 to July 2009 for the fixed line, mobile and Internet telecommunication sector on a grid of 5 points.

The aspects used in this questionnaire are largely based on the Reference document of the 4th protocol of the Accord Général sur le Commerce des Service (AGCS) and are briefly described below. A fact sheet of key events that took place in the telecommunications regulatory environment is also attached for consultation purposes for the period beginning January 2008 and ending in July 2009.

It should take 5 to 7 minutes of your time to complete this questionnaire.

Below find a table defining the aspects taken into account in the survey for reference in completing the following questionnaire.

Aspect	Factors Taken into Account
Market Entry	Transparency in the granting of licences. The applicants should know the clauses, conditions, criteria and time necessary to reach a decision concerning their application. Licence conditions. Questions of exclusivity.
Rare Resources	Access to the allocation of frequencies in the appropriate times in a transparent and indiscriminate way. Numbering and the right of way. Allocation of telephone numbers and fees linked to the location of pylons.
Interconnection	Interconnection with a major operator must be provided in all technical feasibility in the network. Interconnection quality comparable to any similar services offered by the operator's own network. Reasonable interconnection rates. Interconnection unbundling. Sharing of incoming and outgoing IDD receipts. Payment of interconnection linking costs and switch interfaces. Payment of fees for interconnection technical fault reporting services.
Price Regulation	Price regulation payable by the consumer.
Regulation of Anti-Competitive Practices	Anti-competitive cross-subsidies. Use of information obtained from competitors for anti-competitive purposes. Refusal to place technical information on essential installations and pertinent business information at the availability of competitors at the appropriate times. Prohibitive prices. Price discriminations and setting of excessively low prices. Refusal to deal with operators and other parties. Vertical restriction. Technical disruption of interconnection. Sharing of pylons and installations by the main branch and its subsidiaries in different market segments.
Universal Service Obligation (USO)	Management of programmes/funds for universal service in a transparent and indiscriminate way and neutrally on the competitive plan and which is not more obstructing than necessary for the type of universal service defined by the decision-makers.
Service Quality (SQ)	Provision of service quality truly in accordance with that which is promised according to the network flux control mechanisms. Specific criteria can be called quality (for mobile and fixed lines) and connection speed (for the Internet)

#### Telecommunication Regulator Environment of the FIXED LINE SECTOR January 2008 – July 2009

Please tick the box, which best represents the quality of the regulatory environment for each aspect according to your degree of satisfaction. The number 1 means that you are very unsatisfied, 2 unsatisfied, 3 rather satisfied, 4 satisfied and 5 very satisfied. If you think that you do not have enough information relating to a given question, you do not have to answer it. (Click twice on the box chosen, a dialogue box will open, choose "activate box" in the window, click OK.)

	Very unsatisfied				Very satisfied
Market entry	1	2	3	4	5

	Very unsatisfied				Very satisfied
Access to rare Resources	1	2	3	4	5

	Very unsatisfied				Very satisfied
Interconnection	1	2	3	4	5

	Very unsatisfied				Very satisfied
Price regulation	1	2	3	4	5

	Very unsatisfied				Very satisfied
Regulation of anti-competition practices	1	2	3	4	5

	Very unsatisfied				Very satisfied
Universal service obligation	1	2	3	4	5

	Very unsatisfied				Very satisfied
Service quality	1	2	3	4	5

Comments:
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### Telecommunication Regulator Environment of the MOBILE SECTOR January 2008 – July 2009

Please tick the box, which best represents the quality of the regulatory environment for each aspect according to your degree of satisfaction. The number 1 means that you are very unsatisfied, 2 unsatisfied, 3 rather satisfied, 4 satisfied and 5 very satisfied. If you think that you do not have enough information relating to a given question, you do not have to answer it. (Click twice on the box chosen, a dialogue box will open, choose "activate box" in the window, click OK.)

	Very unsatisfied				Very satisfied
Market entry	1	2	3	4	5

	Very unsatisfied				Very satisfied
Access to rare Resources	1	2	3	4	5

	Very unsatisfied				Very satisfied
Interconnection	1	2	3	4	5

	Very unsatisfied				Very satisfied
Price regulation	1	2	3	4	5

	Very unsatisfied				Very satisfied
Regulation of anti-competition practices	1	2	3	4	5

	Very unsatisfied				Very satisfied
Universal service obligation	1	2	3	4	5

	Very unsatisfied				Very satisfied
Service quality	1	2	3	4	5

Comments:

**Telecommunication Regulator Environment of the BROADBAND (INTERNET) SECTOR  
January 2008 – July 2009**

Please tick the box, which best represents the quality of the regulatory environment for each aspect according to your degree of satisfaction. The number 1 means that you are very unsatisfied, 2 unsatisfied, 3 rather satisfied, 4 satisfied and 5 very satisfied. If you think that you do not have enough information relating to a given question, you do not have to answer it. (Click twice on the box chosen, a dialogue box will open, choose "activate box" in the window, click OK.)

	Very unsatisfied				Very satisfied
Market entry	1	2	3	4	5

	Very unsatisfied				Very satisfied
Access to rare Resources	1	2	3	4	5

	Very unsatisfied				Very satisfied
Interconnection	1	2	3	4	5

	Very unsatisfied				Very satisfied
Price regulation	1	2	3	4	5

	Very unsatisfied				Very satisfied
Regulation of anti-competition practices	1	2	3	4	5

	Very unsatisfied				Very satisfied
Universal service obligation	1	2	3	4	5

	Very unsatisfied				Very satisfied
Service quality	1	2	3	4	5

Comments:

## Appendix 3

**Table 23: Assessment by category 1 of the regulatory environment for broadband, fixed-line and mobile sectors**

<b>Category 1</b>	<b>Broadband</b>	<b>Fixed</b>	<b>Mobile</b>
Market Entry	0,12	0,29	0,29
Access to Scarce Resources	-0,21	0,00	-0,07
Interconnection	-0,07	0,00	-0,21
Tariff Regulation	-0,72	-0,18	-0,24
Regulation of Anti-competitive practices	-0,53	-0,50	-0,44
Universal Service Obligations (USO)	-0,50	-0,13	0,19
Quality of Service (QoS)	-0,53	-0,41	0,19

## Appendix 4

**Table 24: Assessment by category 2 of the regulatory environment for broadband, fixed-line and mobile sectors**

<b>Category 2</b>	<b>Broadband</b>	<b>Fixed</b>	<b>Mobile</b>
Market Entry	-0,57	-0,57	0,14
Access to Scarce Resources	-0,29	-0,67	0,00
Interconnection	-0,33	-0,17	0,17
Tariff Regulation	-0,14	-0,43	-1,00
Regulation of Anti-competitive practices	-0,57	-0,50	-0,71
Universal Service Obligations (USO)	-0,33	0,29	0,14
Quality of Service (QoS)	-0,71	0,29	0,14

**IDRC**  **CRDI**

  
*Acacia*

ISSN: 2073-0845