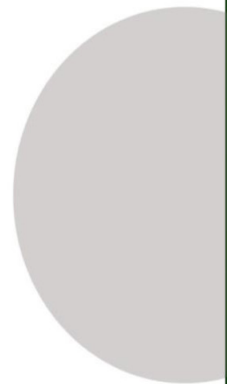
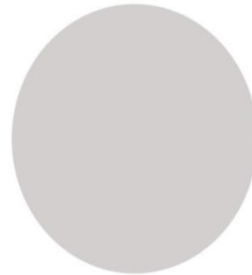


# BROADBAND IN TURKEY COMPARED TO WHAT?



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AN *infoDev* PUBLICATION PREPARED BY:  
Çagatay Telli  
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This case study is one of an initial series of seven that will contribute to the Broadband Strategies Toolkit, an online resource for policy-makers and regulators, especially in developing countries (see [www.broadband-toolkit.org](http://www.broadband-toolkit.org)). The Toolkit and its case studies are generously funded by the Korean Trust Fund (KTF) on Information and Communications for Development (IC4D). The KTF is a partnership between the government of the Republic of Korea and the World Bank Group whose purpose is to advance the ICT4D agenda to contribute to growth and reduce poverty in developing countries. The KTF, as well as Philippe Dongier, Sector Manager (TWICT) and Valerie D'Costa, Program Manager (*infoDev*), are owed the author's gratitude for their support and guidance on this project.

## Executive Summary

Turkey has throughout history been prominent as a center of commerce because of its land connections to the continents of Europe, Asia and Africa and the sea surrounding it on three sides. An Organization for Economic Cooperation OECD member, it has been awaiting European Union (EU) membership<sup>[U1]</sup> since 1987. As an upper-middle-income economy, Turkey suffers from comparison with these mainly high-income groupings. Its fixed broadband penetration stood at 9.4 subscriptions per 100 inhabitants in June 2010 compared to the OECD average of 24.2 and 34% of Turkish homes had a broadband connection compared to the EU average of 61% in 2010.

These statistics disguise the fact that, compared to other countries in its income group, Turkey is doing relatively well. E-government initiatives have been a major driving force for development of the broadband ecosystem. This has triggered demand by enterprises in the ICT sector and motivated citizens to increase Internet usage. Ensuring a shared vision among political leaders and technocrats has also been an important factor in pushing e-government programs. Political leaders saw e-government as a central instrument that would support public reforms and larger changes in the political system. A central organizational structure was formulated to develop strategies and put public money into the pipeline for a set of strategically important projects with high value and high transaction.

The high tempo growth of Turkish economy in the last decade is another supportive factor. The various market-oriented reforms have been implemented complemented with a proactive

foreign policy resulting in large sums of overseas capital flowing into the country.

Communications, software and hardware segments of ICT industries have expanded rapidly. This has included significant investment in upgrading mobile networks to broadband. Broadband mobile networks were only launched in 2009, yet by the end of 2010 around a quarter of the population were capable of accessing high-speed wireless services.

The Turkish population has also reacted to social networking in a major way. The country is the fourth largest Facebook market in the world. Turkey's own social media content is growing and Turkish web sites are becoming more popular and increasingly diversified.

Nevertheless the country continues to face economic and social barriers to effectively absorb broadband technologies on a large scale and better utilize them for leveraging overall economic competitiveness. Fixed broadband competition is limited and dominated by ADSL technology. ICT skill gaps among small and medium enterprises and the less educated need to be adequately addressed with participation of private initiatives. The lack of a suitable national accounting framework for more detailed analysis hinders international benchmarking in ICTs and innovation.

If Turkey can overcome these barriers, the results could be considerable. According to the National Broadband Vision study, broadband could boost economic growth by 0.8-1.7 percentage points per year. This economic momentum enabled by an enhanced broadband ecosystem would create 180,000-380,000 new jobs each year.

# 1 Turkish ICT Sector: A General Assessment

## 1.1 Background

Geographically, the Republic of Turkey is located at a point connecting the continents of Europe, Asia and Africa. Because of its geographical location the mainland of Anatolia possesses an extraordinary geo-strategic value. In the past, it was an important expansion post to many great political powers including Hatti, Hittite, Ancient Greek, Urartu, Phrygia, Ionia, Persia, Roman, Byzantine, Arab, Seljuk and Ottoman. It has also been prominent as a center of commerce because of its land connections to three continents and the sea surrounding it on three sides (Figure 1-1).

Modern Turkey was founded in 1923 by Mustafa Kemal following the collapse of the 600-year-old Ottoman Empire. After a period of one-party rule, since the 1950 election, Turkey has experienced a democratic political system based on multi-party politics. Turkey became a European Union (EU) candidate country in 1999 and, in line with requirements, went on to



Figure 1-1: Geographic position of Turkey

introduce substantial political and economic reforms. After intense bargaining, EU membership negotiations were launched in October 2005.

Turkey has two levels of government and several types of administrations: National administration

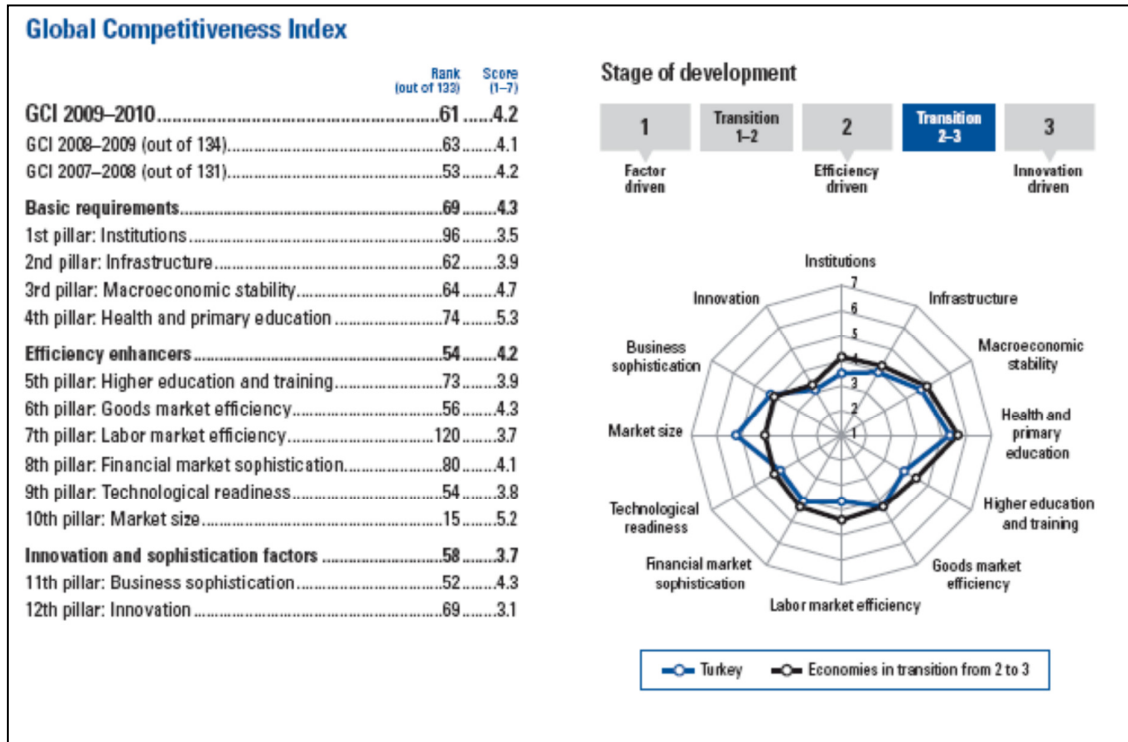


Figure 1-2: Global Competitiveness Index, Turkey, 2010

(Source: Global Competitiveness Index, 2010)



with ministries and agencies at the central government level and field offices in provinces and districts. Local governments include 3,225 municipalities in areas with dense populations and 81 special provincial administrations with jurisdiction beyond municipal boundaries. In the last few years Turkey developed another organizational structure to initiate a more diversified and flexible decision making system to support endogenous growth of its economic regions by introducing Development Agencies. Currently 26 Development Agencies have become fully operational.

With an increasingly urban population of around 75 million<sup>1</sup> and a GDP per capita of around US\$10,000 in purchasing power parity, the Turkish economy is largely developed. Benefiting from both a capable and young labor force<sup>2</sup> and diverse natural resources the country is among the world's leading producers of agricultural products; textiles; motor vehicles, ships and other transportation equipment; construction materials; consumer electronics and home appliances. Turkey has a rapidly growing private sector not only in industrial activities but also in competitive services such as banking, transport, tourism and communications.

Following the financial crisis in 2001 major economic reforms were launched and successfully fulfilled. The monetary, fiscal and financial reforms implemented in the 2000s made Turkey's macroeconomic framework very robust. The economy rebounded rapidly and economic restructuring was transformed into strong and sustained growth. This profile of macroeconomic path was confirmed by impressive figures: real GDP growth leading the OECD and Euro area, inflation rates coming down to single digit levels sharply, strong fiscal adjustment and large inflows of capital rushing into the country.

Internalization and underlying dynamism of the economy can be best reflected by the fact that Turkey has lately become a major destination for

---

<sup>1</sup> More than 70 percent of the Turkish population is concentrated in urban areas and Turkey ranks among the leading countries in terms of urbanization rate. Source: Turkish Statistical Institute, [http://www.turkstat.gov.tr/PreTablo.do?tb\\_id=39&ust\\_id=11](http://www.turkstat.gov.tr/PreTablo.do?tb_id=39&ust_id=11) and OECD (2010) Factbook: Economic, Environmental and Social Statistics, Paris.

<sup>2</sup> The median age of the country is 28.8 indicating a concentrated structure of young population in the total. More than 60 percent of total population is below 35 age. Source: Turkish Statistics Yearbook (2009), Address Based Population Registration System Population Census Results.

Foreign Direct Investment (FDI) flows.<sup>3</sup> According to the figures the Turkish economy started to absorb growing amounts of foreign capital and it ranks before many similar developing economies such as Chile, Greece, Korea, and Israel. The average level of FDI inflows was around just US\$ 100 million throughout the 1990s. Today with an annual average of around US\$ 15-20 billion, Turkey is the 15th most attractive destination for FDI in the world.<sup>4</sup>

From a traditional agricultural and low value added industrial configuration Turkey has transformed into a dynamic and sophisticated economy. While services account the larger share in national value added with 43%, industry claims 11%, and trade, transport and communication sectors each have 8% shares. Agriculture accounts for only 5% of total production.

After its recent aggressive growth records, Turkey's GDP doubled reaching above USD 650 billion in 5 years. Following the recent economic downturn Turkish economy proved to be resilient and showed a strong rebound. According to estimates GDP growth in 2010 should be very strong, and be probably among the highest in the OECD and EU areas at an annual rate between 7-8%.<sup>5</sup>

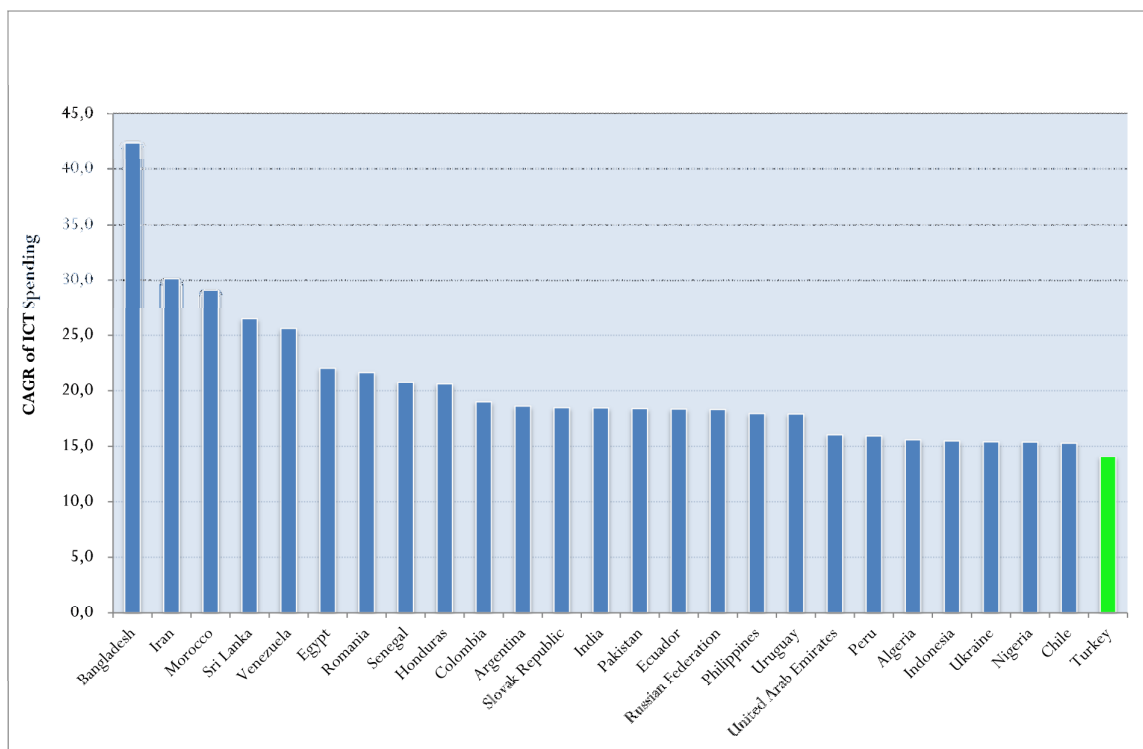
A number of challenges loom in the horizon. In a world of highly connected economic and political interdependences and growing uncertainty, raising overall productivity and competitiveness is the key to Turkey's economic success in the long run. For sustained economic performance, major elements of the policy mix are maintaining the predictability of macroeconomic policies, reducing capital and employment costs, supporting employment levels, and financing external imbalances with resilient resources such as FDI.

---

<sup>3</sup> For more information on general investment climate in Turkey also see The World Bank (2010), Turkey Investment Climate Assessment: From Crisis to Private Sector Growth. This report draws on the analysis of firm-level survey data collected during April 2008-January 2009, supplemented by other sources, to provide a comprehensive and up-to-date description of the investment climate facing Turkish firms of all size classes, including the impact of government regulations.

<sup>4</sup> UNCTAD (2008-2010), World Investment Prospects Survey.

<sup>5</sup> According to the January edition of the Global Economic Prospects 2011 report prepared by the World Bank, Turkey's gross domestic product (GDP) growth is expected to register 8.1 percent for 2010.



**Figure 1-3: Fastest growing economies in ICT spending, 2003-2009** (Source: OECD database, Economist Intelligence Unit and EITO. The aggregate for Turkey is calculated for the period 2005-2009)

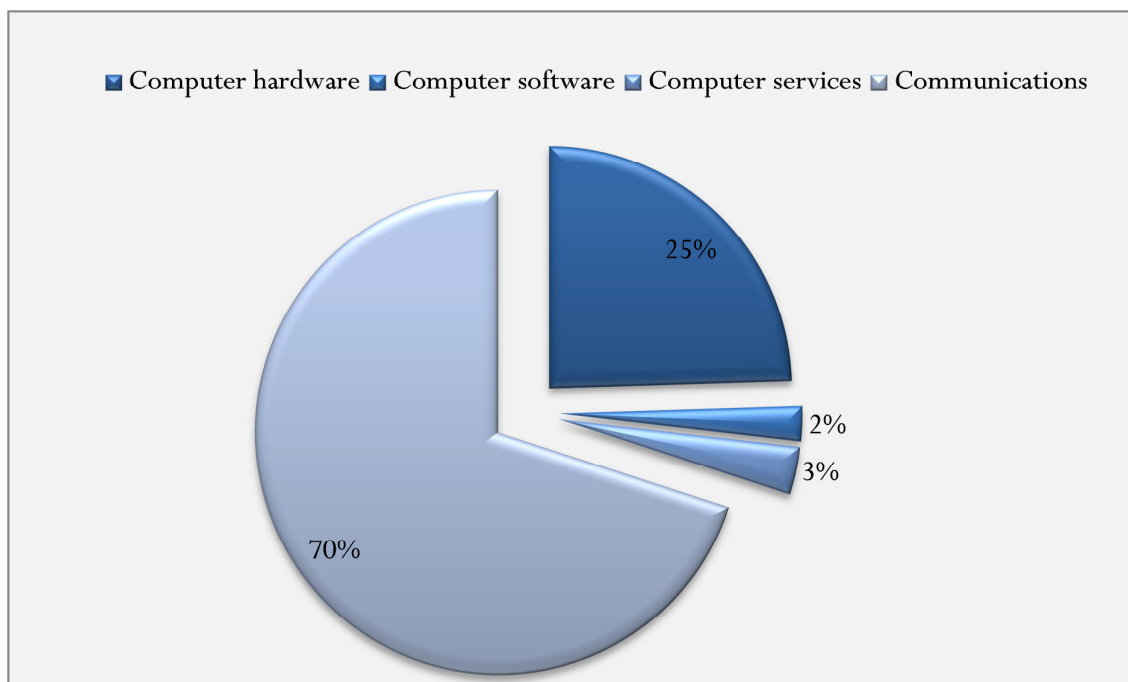
The Turkish economy needs microeconomic reforms to upgrade its productive potential. Information and Communications Technologies (ICT) have shown positive and significant effects on economic growth and are recognized to be among most critical general purpose technologies which have great transformative potentials. In the current economic environment, policies and investment that promote and accelerate ICT adoption can have an important role to play and improve the country's competitiveness.

According to Global Competitiveness Index, (2010), Turkish economy is positioned between innovation and efficiency driven stages of development (Figure 1-2). It is an open market economy in structural transition facing fierce competition in traditional sectors like textile, agriculture, light machinery and automobiles from other developing countries like China and India. Raising productivity and supporting innovation in these sectors will be of critical importance to keep its competitiveness intact. Therefore in order to make a successful leap from an efficiency-drive to an innovation-driven economy, the Turkish economy needs to upgrade traditional sectors and harness the transformative potential of ICTs.

## 1.2 ICT Sector

In the Turkish case, the lack of a suitable national accounting framework for more detailed analysis hinders international benchmarking in most emerging policy areas notably ICT and innovation. There still remains a persistent information gap on this issue following many reforms in the national statistical system. The Turkish national accounts do not provide information about the size of ICT sector in terms of value added or jobs. Nevertheless utilizing other indicators, it is estimated that Turkey's ICT sector accounts for a lower share of economic production activities compared to advanced industrial economies but has a very robust growth potential.

Market size and ICT spending are among the available indicators for comparison. Turkey was placed 13<sup>th</sup> in the list of highest spending countries within the OECD in 2007 with spending of USD 36 billion or 6.8% when compared to GDP. Various institutions put forward similar estimates concerning the Turkish ICT sector. However estimates vary and a commonly agreed figure is still unavailable. In the absence of official statistics analysts frequently rely on business intelligence data provided by different consulting companies.



**Figure 1-4: The composition of ICT spending in Turkish economy, 2009** (Source: SPO 2010, Information Society Statistics, Ankara; based on data provided by IDC.

Even the State Planning Organization (SPO) uses these estimates in its official documents and reports. According to the SPO the size of the ICT market in Turkey was around US\$ 20-25 billion in 2009.<sup>6</sup> Turkey ranks among the highest growth countries in ICT spending (Figure 1-3).

The Turkish ICT sector has a great potential for growth. The ICT market experienced double-digit growth over the last ten years since the financial crisis the country experienced in 2001, but the share of software and services is significantly behind Western markets, indicating substantial growth potential.<sup>7</sup>

The Turkish ICT market is dominated by communications, constituting approximately 70 percent of the total and the whole IT market, which constitutes the hardware and software categories, comprising the other 30 percent.<sup>8</sup>

The computer hardware segment is the second largest part of the ICT sector with a 25% share following communications. The penetration rate of personal computers (PCs) has grown rapidly and reached levels of 253 per 1,000 people in 2009 from 92 per 1,000 in 2006. This figure is

higher in European markets, being 519 per 1,000 people in Italy, 725 in Germany and 766 in France. The temporary value-added tax (VAT) reduction on consumer durables, introduced in March 2009 in the Turkish market to counter the impact of the financial crisis, augmented the sales of PCs and laptops in 2009.<sup>9</sup>

Leading multinational enterprises, such as IBM, Hewlett-Packard, Dell, Siemens, Cisco, and NCR, have considerable shares in domestic IT market. These firms typically operate through their local subsidiaries, which assemble PCs and other IT hardware components imported from overseas. Sales are realized both domestically and for export to the EU, Eastern and Central Europe, and the Middle East.

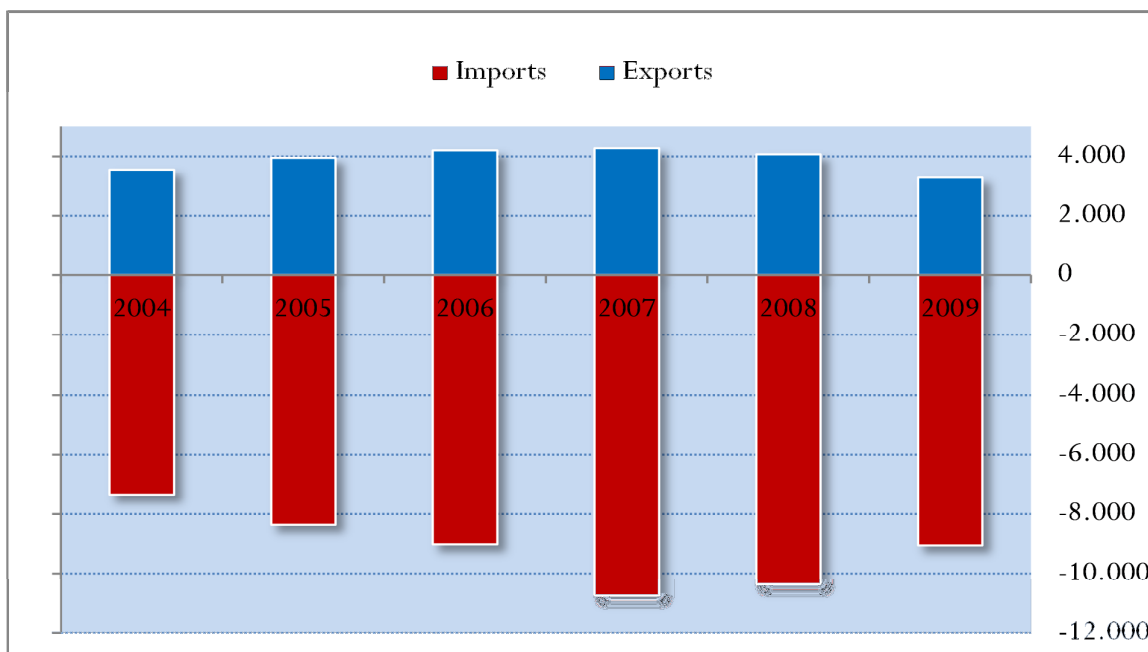
Computer services and computer software have a much lesser role in the Turkish economy because of lower business use of ICTs and the rapid growth of mobile and other consumer communication services. In contrast more

<sup>6</sup> SPO (2010), Information Society Statistics, Ankara (Turkish).

<sup>7</sup> Turkey Invest's ICT sector information at <http://www.invest.gov.tr/en-US/sectors/Pages/ICT.aspx>

<sup>8</sup> SPO (2010) Information Society Statistics, Ankara.

<sup>9</sup> Economist Intelligence Unit (2010). The reduction in value added tax (VAT) on consumer durables, introduced in March 2009 to combat the impact of the financial crisis, boosted PC and laptop sales. The number of PCs per 100 population is expected to rise to 38 per 100 population as of 2014.



**Figure 1-5: Evolution of ICT foreign trade in Turkish economy, US\$ million, 2004-2009**

(Source: Undersecretariat of Foreign Trade –Export Promotion Center, IGEME)

sophisticated economies have a somewhat larger share of computer services and software.<sup>10</sup>

While being relatively less important and at its early stage of progress, the software industry is among the fastest developing and most promising sectors in the country. Over the last two decades, the sector has gained great momentum in terms of capacity, production and usage. According to some analysts, the software industry accounts for a much larger share in the total IT market than previously thought. It is estimated that national software market reached US\$ 1.6 billion in 2009 with double-digit growth over the last years.<sup>11</sup>

Turkey has rapidly developed its international linkages in the ICT sector. Export and import volumes in the ICT sector have reached to US\$ 3.27 billion and US\$ 9.05 billion respectively as of 2009 (Figure 1-5). In terms of international trade balance, the Turkish economy is positioned to be a net importer of ICT goods and services due to mainly being a large market for consumer

electronics and computer hardware. In 2009, while the Turkish economy exported US\$ 472 million computer hardware products it imported US\$ 4,444 million of the same goods leading to a US\$ 3,972 million trade imbalance.

The ICT sector plays a significant role in terms of employment creation opportunities and generation of R&D demand in Turkish economy. According to the latest available data, direct employment by the ICT sector was 160,644 in 2006.<sup>12</sup> Including employed people with ICT skills by other industries, a broader definition of ‘ICT related employment’ indicates the sector provides much larger opportunities for job creation: the percentage share of ICT related employment in total employment was above 10 percent in 2006. A considerable and steady increase in this figure has been observed over the recent years and it reached to 10.8 percent of total employment as of 2009.

<sup>10</sup> For further reading on market segments of ICT spending please see OECD (2008), Information Technology Outlook, Paris, pp. 56.

<sup>11</sup> Source: Interpromedya (2009), ICT Market Research. Please see [www.interpromedya.com.tr](http://www.interpromedya.com.tr)

<sup>12</sup> Source: TURKSTAT Annual Industry and Service Statistics Survey

## 2 Turkey's Broadband Ecosystem: A General Assessment

This section develops a country snapshot of the national broadband ecosystem in a historical, institutional and economic context. Different aspects of national broadband adoption will be covered such as infrastructure, services, market environment, applications and usage.

### 2.1 Synopsis of Recent Evolution of Markets and Public Sector Reform

Reform and structural change in the overall ICT and broadband sector started early with the most important segment of telecommunications. The growth and evolution of the Turkish telecom industry in the last 30 years had five separate phases:

1. Infrastructure pickup (1980 to 1984): Network infrastructure buildup was a priority and public investments played a major role in this period. As a result, the number of access lines grew by 14 percent on average; however, despite the acceleration in telecom investments and growth in the subscriber base, long waiting lines remained during this time.
2. Fast wire line growth (1985 to 1994): The late 1980s was a period of ongoing intense infrastructure investment and fast growth. During this period, the government's annual telecommunications investments averaged US\$ 656 million and access lines grew by an average of 20 percent annually. Also, the PTT ("Posta Telefon Telegraf") was split into postal services and Turk Telekom. Two GSM 900 licenses were granted in 1993 to Turkcell and Telsim, with revenue sharing agreements with Turk Telekom.
3. Wireless revolution (1995 to 1999): The late 1990s were characterized by explosive growth in wireless phone subscriptions. In 2000, annual subscription growth exceeded 100 percent, and wireless phone penetration reached 25 percent. Average annual investment in the wireless subsector was more than US\$ 1 billion. During this period, the government continued investments in wire line at US\$ 560 million per year and wire line penetration reached 28 percent. There were several unsuccessful attempts to privatize Turk Telekom.
4. Preparation for liberalization (2000 to 2004): This period is characterized by maturity in wire line and decelerated growth and increased competition in wireless. Two GSM 1800 MHz licenses were auctioned in May 2000, at a substantially higher fee (close to US\$ 3 billion including VAT, compared to US\$ 500 million for the initial licenses bought in 1999) to end the revenue-sharing agreements. The Telecommunications Law in 2000 established an independent regulator, the Information and Communication Technologies Authority (ICTA) and predetermined full market liberalization starting from January 2004.
5. The period of post liberalization and broadband revolution (2004-...): The government maintained its full support for liberalization and privatization of the telecommunications sector. The ownership of Telsim, a privately owned telecom operator, was transferred to the government after its owners were convicted of fraud. The operator was afterwards privatized in an international tender won by Vodafone in December 2005. 3G mobile licenses were awarded to all three operators, Turkcell, Vodafone and Avea, in 2008 and services began in 2009. This period is also characterized with increasing competition, declining fixed line penetration and falling voice revenues. Broadband, both fixed and mobile, have become a major source of revenue and a general technological platform for overall communication services.

As a result of structural policies in order to liberalize the market competition flourished, new entrants emerged as strong operators and foreign capital flew into the country.<sup>13</sup>

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<sup>13</sup> The incumbent operator of the telecommunication sector is Turk Telekom. The legal monopoly of Turk Telekom in

Nonetheless a distinction should be made between fixed and mobile segments of communications. As to the national market, the fixed and mobile subsectors have radically dissimilar configurations in terms of productivity, liberalization, and ownership. Mobile is more competitive and productive, with a more advanced regulatory structure. On the other hand, in the fixed subsector, productivity is relatively low.<sup>14</sup>

As observed in many other developed and saturated markets, fixed-line penetration is in continuous decline since its peak period of 2001-2004. Consequently, the penetration rate is down to 23.3 percent in 2009, from around 28 percent in 2004. The penetration is low compared to EU countries, for example 37 percent in France, 43 percent in Germany, 46 percent in Greece and 31 percent in Hungary.<sup>15</sup> The Turkish mobile telecommunications segment has achieved a considerable growth with a share of 60 percent within total sector revenue in 2008 and is expected to continue growing. Mobile number portability (MNP), launched in November 2008, as well as 3G mobile services introduced in July 2009, have accelerated the competition between the three market players.

Analysts forecast mobile virtual network operators (MVNO) are also expected to start operating in the market along with the three mobile operators. Mobile-phone subscribers are expected to grow at an annual rate of 5.5 percent between 2010 and 2014, following a fall of 0.5 percent in 2009. This will increase the mobile-phone penetration rate in Turkey to about 113 percent in 2014, similar to most EU countries, where penetration rates are generally around 100-120 percent.

---

the field of fixed line telephone services ended in 2004 and the sector was opened to full competition. Since then, many operators entered the sector to operate in the field of fixed line telephone services. 55% of the public shares in Turk Telekom were privatized in 2005. As regards to mobile subsector services started as early as 1994 and currently three operators, namely Turkcell, Vodafone, and Avea, are operating in the field of mobile communication.

<sup>14</sup> McKinsey Global Institute (2003), Turkey: Making the Productivity and Growth Breakthrough

<sup>15</sup> According to the analysts the outlook for fixed-line telephone penetration does not look promising. Fixed-line penetration is expected to decline to 19 telephone main lines per 100 people by 2014.

## 2.2 Institutional Setup: Current Policy, Legal and Regulatory Framework

Table 2-1 exhibits major institutions and establishments that are involved in the ICT and broadband sector. The State Planning Organization (SPO) is the leading institution regarding government policies and strategies for the overall ICT sector. It prepares pivotal national strategies and programs such as development plans, economic programs and sector strategies and action plans. SPO is also involved in resource allocation to e-government projects and applications and has access to private sector organizations through various mechanisms. The Office of the Prime Minister has lately become a significant coordinating and a consulting body in terms of e-government initiatives. In regards to ICT related research and determining the national agenda for general science and technology policies the Scientific and Technological Research Council (TUBITAK) is the main body.

The *Ministry of Transport and Communication* (MoTC) is responsible for sector oversight in the provision of public services including information and communications to the end users. The MoTC is also the top official body on issues of safety, quality, standardization and balanced development of the communications infrastructure. The *Information and Communications Technologies Authority* (ICTA), founded in 2000, has the overall regulatory responsibility over communications sector.

A number of non-governmental organizations are also involved in the general direction and structure of the ICT sector. The most influential establishments include the Turkish Informatics Association (TBD), Informatics Sector Association (TUBIDER) and Turkish Informatics Industry Association (TUBISAD).

Turkey's public sector has a tradition of passing legislation rather than using secondary regulations to interpret basic laws. In an attempt to liberalize communications, to regulate provision, diffusion and usage of information and enable e-transformation different legislation was enacted throughout the 2000s. As to the legal framework in effect (or pending) the following documents constitute the fundamental architecture for the nation:

Institutions	Abbreviations	Functions	Web pages
Office of the Prime Minister	NA	Office of the Prime Minister coordinates numerous e-government projects, gives advisory services to implementing agencies, encourages the adoption of ICT by public institutions.	NA
Ministry of Transport and Communication	MoTC	MoTC is to provide the production and the control of quality, balanced, safe, environmental friendly, fair and economic transport, information and communication services for all users.	<a href="http://www.ubak.gov.tr">www.ubak.gov.tr</a>
The State Planning Organization	SPO	SPO provides general vision and strategies including ICT sector, integrates these specific visions into broader economic programs and coordinates the implementation process. SPO also approves public investment projects including ICT and e-government applications.	<a href="http://www.spo.gov.tr">www.spo.gov.tr</a>
Information and Communication Technologies Authority	BTK	BTK prepares plans in telecommunication sector according to Wireless, Telephone and Telgraph Law . Then BTK presents the plans to MoTC. BTK also regulates and audits telecommunication market.	<a href="http://www.tk.gov.tr">www.tk.gov.tr</a>
International Satellite and Cable Operator	TURKSAT	Turksat A.S. is the only satellite operator company in Turkey. Turksat manages and operates three satellites (Turksat 1C, Turksat 2A, Turksat 3A) and provides all types of satellite communications.	<a href="http://www.turksat.com.tr">www.turksat.com.tr</a>
The Scientific and Technological Research Council of Turkey	TUBITAK	The Scientific and Technological Research Council of Turkey (TÜBİTAK) is the leading agency for management, funding and conduct of research in Turkey. It was established in 1963 with a mission to advance science and technology, conduct research and support Turkish researchers.	<a href="http://www.tubitak.gov.tr">www.tubitak.gov.tr</a>
Turkish Informatics Association	TBD	TBD is a non governmental organization which was established in 1971 to expand Informatics Culture by members.	<a href="http://www.tbd.org.tr">www.tbd.org.tr</a>
Informatics Sector Association	TUBIDER	TUBIDER IT Sector Association was founded in November in 1999 so as to protect rights and interests of the IT companies operating in the informatic sector and to ensure vocational regulations are implemented. TUBIDER continues its operations having reached to 800 registered members and more than 1500 applicants.	<a href="http://www.tubider.org.tr">www.tubider.org.tr</a>
Turkish Informatics Industry Association	TUBISAD	Established in 1979, TUBISAD is the largest non-governmental organization of the Turkish private ICT sector, including industries and services, with a representation base of 95 % through its direct membership. TUBISAD has a group of members comprising of almost 180 leading ICT companies of which are Software Developers, Hardware Manufacturers, Hardware and Software Distributors, Telecommunication Companies, System Integrators, Local Subsidiaries of IT and Communication multinational companies and/ or Consultants.	<a href="http://www.tubisad.org.tr">www.tubisad.org.tr</a>
General Directorate of Postage and Telegraph Organization	PTT	Postage and telegraph services are operated by General Directorate of PTT.	<a href="http://www.ptt.gov.tr">www.ptt.gov.tr</a>

**Table 2-1: Major institutions and establishments in ICT sector**

- In the field of Information Society: Right to Information Law (2003), Inclusion of cybercrime in the Criminal Code (2004), Electronic Signature Law (2004), Amendments in the Intellectual Property Rights Law, Universal Service Law (2005), Law No. 5651 on regulating broadcast in Internet and combating crimes committed through such broadcast (2007), Electronic Communications Law (2008), and secondary legislation on telecommunications.
- In the field of IT and e-government: Public Procurement Law (2008), Census Services Law, Law No.5942 amendments in the Traffic Law No.2918, Circulars regarding the payment of taxes online, Draft Data Protection and Privacy Law (pending in the Parliament), e-Commerce studies regarding the harmonization of 2000/31 EC, and Draft law covering partial amendments for various e-government services.<sup>16</sup>

Box 2-1 gives a quick snapshot of major national strategies and initiatives targeting e-transformation in the public sector and broadband adoption at large. Evolution of public policies with regard to Internet based technologies and e-transformation can be analyzed under four distinct periods:

- Data processing and computerization (1970-1990): During this period the focus of public policy was mainly on automating back-office functions, such as processing of the census and taxes.
- Building basic ICT capabilities (1990-2000): In the 1990s, there emerged an effort to provide basic ICT facilities and capabilities from a modernization perspective of the government sector. The “Turkey: Informatics and Economic Modernization” project of the World Bank in 1993 was an initiator in this sense. In the second half of 1990s the National Informatics Infrastructure Main Plan of the Ministry of Transportation was an early example

of the first organized action in the public sector. However the succession of governments; high inflation and recession; and political and economic instability prevented much implementation from taking place.

- The era of e-government (2000-2010): Political stability with Development and Justice Party rule following 2002 and negotiation process with the EU helped government agencies to devise more integrated and organized frameworks for action which included active participation of private sector and non-governmental organizations. The E-Transformation Project and the Information Society Action Plan are good examples of this period. The overall goal in these documents was defined as promoting Information Society policies to increase Turkey’s competitiveness. A further goal was to move from labor-intensive production to a higher-value-added production and from providing a source of low-cost labor to a highly educated workforce in a knowledge based economy. However going beyond rhetoric, the real focus was on implementing e-government applications and demand aggregation policies rather than promoting e-commerce and the digital economy.
- Beyond e-government (2010-...): With increasing diffusion of ICTs into business applications and government operations, there are now new signals calling for a shift in public policies. Growing businesses are in clear need of accelerated ICT adoption to leverage their competitive power. The high level of investment in e-government applications is clearly just one component of modernizing the public sector. To better harness the transformative potential of ICTs government agencies are now starting to look beyond e-government. The National Vision for Broadband Strategy and updating studies of the Information Society Strategy provide good illustrations of this process.

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<sup>16</sup> For a more detailed discussion please see OECD (2007) E Government Studies: Turkey, Paris.



- “Turkey: Informatics and Economic Modernization” report was prepared by the World Bank in 1993.
- The Ministry of Transportation published “the National Informatics Infrastructure Main Plan” (TUENA) in 1998. The plan aimed at developing policy actions and strategies for enabling transition to an Information Society. The Internet Advisory Council and The E-Commerce Coordination Council were established in the same year.
- Turkey joined the eEurope+ Initiative, together with other EU candidate countries, in June 2001. Soon after, Turkey started the eTurkey Initiative, which includes the same goals as eEurope+.
- A new government of the Justice and Development Party (AKP) took office on 18 November 2002. The Urgent Action Plan (UAP) was developed. This plan included the foundation of the e-Transformation Turkey Project. The Project initiated in February 2003 with Prime Ministry Circular. The State Planning Organization (SPO) was assigned to co-ordinate the e-Transformation Turkey Project. To realize the stated objectives and to ensure the success of e-Tr, a new co-ordination unit, the Information Society Division, was established in SPO in March 2003.
- Within the framework of e-TR two action plans were executed: Short Term Action Plan (STAP) with 73 actions (2003-2004) (completion rate: 47%), 2005 Action Plan with 50 actions (2005) (completion rate: 40%)
- Information Society Strategy (2006-2010) and Action Plan were developed by SPO and took effect by a High Planning Council decision on 11 July 2006. A new institutional structure was formed by introducing e-Transformation Turkey Executive Board, e-Transformation Leaders and an Advisory Board.
- Prime Minister's Office prepared the country's first National Broadband Vision in cooperation with relevant stakeholders and participation with private sector. The National Broadband Vision under three versions (Turkish, English and Arabic) is to be published before end March 2011.
- SPO commenced studies to update its Information Society Strategy and Action Plan to finalize before end of 2011, and decided to arrange a separate chapter on broadband ecosystem.

#### **Box 2-1: Recent strategies and initiatives related to e-government and broadband ecosystem**

(Source: Interviews with Dr. Ramazan Altınok, Dr. Ertugrul Karacuha, Emin Sadık Aydın, Furkan Civelek, Ahmet Hasanbeseoglu and Ugur Terzioglu).

Turkey faces a new window of opportunity with regard to upgrading competition and productivity by means of better ICT adoption. Promoting and creating a viable broadband ecosystem is the key to success. The country can either let the market determine the pace of development or promote a more rapid development of broadband infrastructure, as has been done in advanced countries. Defining, monitoring, and promoting the broadband ecosystem with effective means is an important area where more focus should be devoted.

### **2.3 Infrastructure Development**

One of the fundamental aspects of broadband ecosystems is broadband infrastructure. As broadband technologies and applications

flourish rapidly, providing good infrastructural capacity has been a key policy concern among government officials. Evaluating infrastructure developments require analysts to monitor a number of indicators at the same time since any single dimension will not be sufficient to provide a complete picture.

Broadband is typically defined as a “high-speed communications network” that offers internet connectivity with download speeds of at least 256 kbit/s.<sup>17</sup> This definition based on the minimum level of speed is a matter of debate though it is clear that broadband technologies

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17 [http://www.oecd.org/document/46/0,3343,en\\_2649\\_34225\\_39575598\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/46/0,3343,en_2649_34225_39575598_1_1_1_1,00.html)

are significantly different from dial-up lines in terms of functioning. No distinct definition for broadband exists in Turkey.

Three basic criteria are incorporated to provide an integrated picture of Turkish broadband development: **Penetration, technologies and prices**. A benchmarking technique is utilized in order to obtain a better picture of the relative performance of national broadband capacity both across countries as well as over time. In isolation, there is a tendency to view national growth rates as high, since, as with any new technology, growth is often in the double digits.

### 2.3.1 Broadband penetration

Overall performance in making broadband an essential part of daily life has been uneven and subject to significant variations among nations. The divide in performance of countries is best reflected by the concept of *broadband penetration gap*. The broadband gap is defined as the discrepancy between benchmark countries and that of host country in terms of adoption of broadband technologies generally measured in household or population penetration. In the case of Turkey, there is a significant fixed broadband gap as compared to other OECD members (Figure 2-1).

A number of factors are important in determining penetration rates but as a general observation countries with relatively high fixed broadband penetration rates tend to have relatively higher per capita GDP and well developed communications infrastructure.<sup>18</sup>

Studies indicate that, though the relationship is not necessarily casual, per capita income is correlated to fixed broadband penetration with a significant correlation coefficient of 0.70. Since the Turkish economy has depicted a strong rebound in the post crisis environment and medium to long-term outlook is promising, rising per capita income levels should establish a major driver force for broadband infrastructure development.

Turkey faces a challenge in order to catch up with OECD members in broadband technologies. Despite growth in broadband infrastructure, when compared to advanced countries, Turkey has recorded somewhat poor performance and has not been able to close the broadband gap. As of the second quarter of 2010, in terms of fixed broadband technologies the leading countries reached penetration levels above 35 percent while Turkey managed only a 9.4 percent subscription based penetration rate.

Turkey's fixed broadband growth rate is lagging the OECD area. During 2010 Turkish fixed broadband growth was 0.83 percent compared to the OECD average of 1.72 percent (Figure 2-2). When compared to major developing economies, Turkish broadband growth is considerably lower; for instance India is expanding its broadband capacity with a growth of 62 per cent in 2010.

Nevertheless the fixed broadband penetration rate in Turkey still exceeds some European

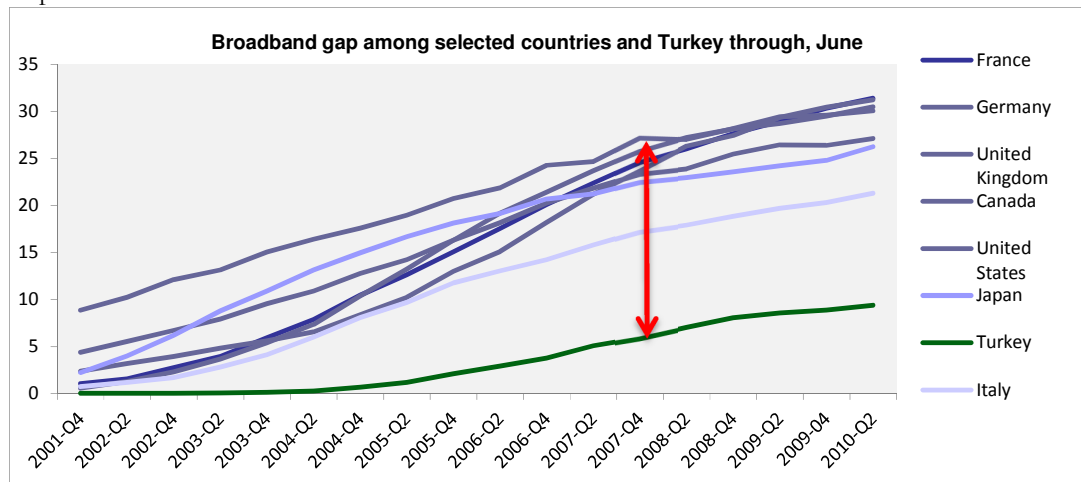


Figure 2-1: Fixed broadband penetration gap with selected countries, 2010

Source: OECD broadband portal and author's own calculations)

<sup>18</sup> OECD (2008), Broadband Growth and Policies in OECD Countries, Paris.

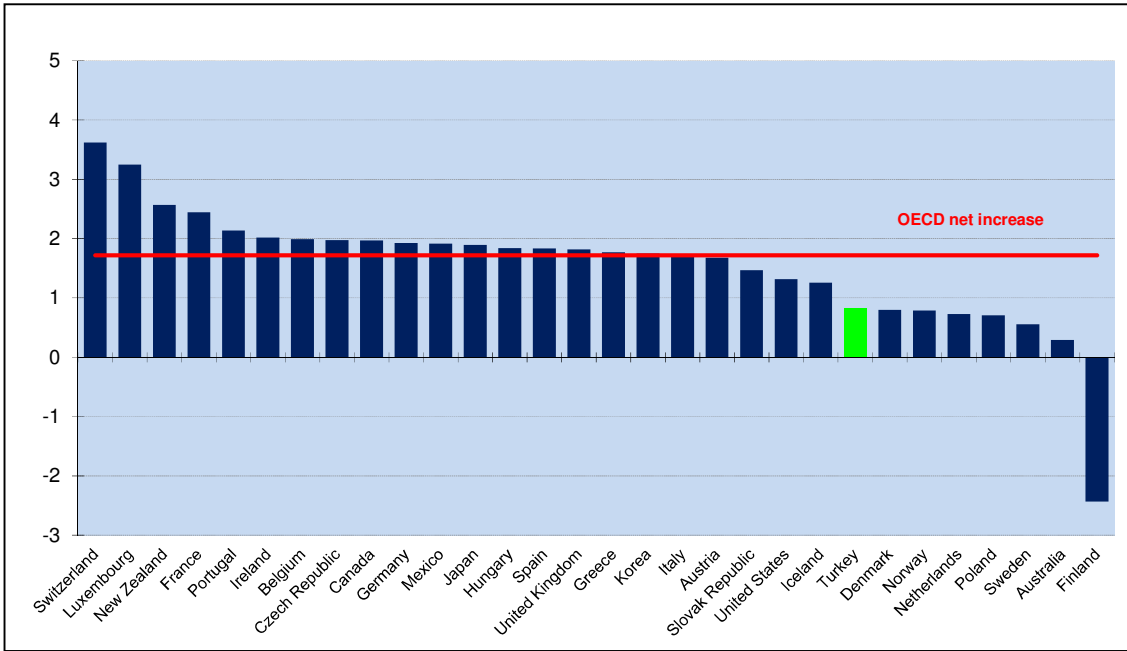


Figure 2-2: Fixed broadband (per 100 inhabitants), net increase, June (2009-2010) (Source: OECD)

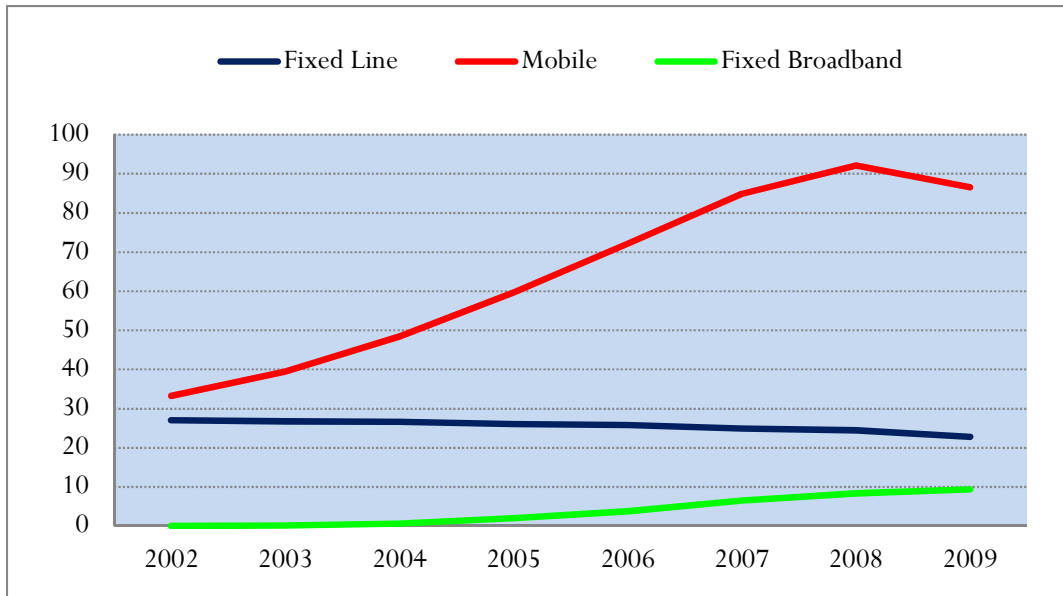


Figure 2-3: Selected penetration indicators, per 100 inhabitants (source: author)

countries such as Poland, Italy, Bulgaria and Romania, and is very close to the rates in Portugal, Hungary, Spain and Estonia. On the other hand, the personal computer (PC) penetration level in Turkey in 2009 was only about 25.3 percent, compared to 77 percent in the UK. Since broadband usage depends on PC penetration, increasing PC usage and ownership

in Turkey are expected to create opportunities for the broadband market.<sup>19</sup>

Turkey's relatively well-developed mobile network has a penetration level around 85 percent and provides another means for broadband access (Figure 2-3). Wireless broadband has shown a significant expansion

<sup>19</sup> Economist Intelligence Unit, 2010.

Item	Subscriptions	Penetration (per 100 people)	Comment
Total broadband	8,516,898	11.6	Fixed and mobile through data cards
Fixed broadband	7,068,878	9.6	ICTA. ADSL, Cable modem, FTTP
3G subscriptions	19,400,000	26.3	ICTA. Technical ability to access mobile broadband without consideration of whether actively using to access Internet
Mobile broadband data cards	1,448,020	2.0	ICTA
		<b>% of households</b>	
Households with computer			Turkstat
- Desktop		33.8	Turkstat
- Portable		16.8	Turkstat
Households with access to the Internet		41.6	Turkstat
Households with broadband access to the Internet		34	Eurostat
- of which DSL		30.5	Turkstat

**Table 2-2: Broadband indicators, Turkey, 2010**

(Source: Adapted from ICTA, Turkstat, Eurostat) (note: Subscription penetration calculated based on population of 73,722,988 reported by Turkstat at December 31 2010)

following the decision of Turkish government to issue 3G licenses during November 2008, making the market an appealing area for future investment. Since then 3G mobile Internet subscriptions using data cards have grown at a rapid pace and as of end 2010 reached 1.5 million subscriptions (total 3G subscriptions reached 19.3 million as of December 2010 according to ICTA). The annual rate of growth in this segment of broadband was 265 percent between 2009 and 2010. As a result mobile broadband is growing much faster than fixed broadband subscriptions (27 percent annual growth as of 2010). Total fixed and mobile broadband through data card subscriptions reached 8.5 million by the end of 2010.

A saturated voice market with declining revenues has motivated operators to rely on mobile broadband network investments for optimizing

profits.<sup>20</sup> There has been a considerable growth in the investments to mobile subsector and more importantly telecommunication operators have changed their strategy significantly by allocating increasingly far more resources to mobile investments. Building up of 3G communication infrastructures constitutes a determining factor for this shift in corporate strategies.

Experiences in many countries show that governments should leave the choice of technology and infrastructure expansion as much as possible to market forces while promoting a level playing field for different technologies. Turkey is implementing a policy of

<sup>20</sup> The revenues from broadband access services provided from the fixed network are rapidly increasing. Parallel with the decrease in the number of fixed line telephone subscribers, the revenues from these services decreased by 17.5% between 2006 and 2009 and the revenues of mobile telephone services increased by 24.4% during the same period.

Number of Subscribers (Million)								
	2008-1	2008-2	2008-3	2008-4	2009-1	2009-2	2009-3	2009-4
<b>xDSL</b>	5.009.135	5.292.840	5.616.697	5.894.522	6.000.174	6.056.519	6.057.986	6.216.028
<b>Cable</b>	43.072	48.725	57.525	67.408	80.211	98.792	114.264	146.622
<b>ISDN</b>	15.719	23.145	17.003	17.096	18.001	17.161	15.211	16.570
<b>Satellite</b>	6884	6782	6742	7075	7063	6993	7117	7074
<b>Mobile</b>	-	-	-	-	-	-	218.812	396.363
<b>TOTAL</b>	<b>5.074.810</b>	<b>5.371.492</b>	<b>5.697.967</b>	<b>5.986.101</b>	<b>6.105.449</b>	<b>6.179.465</b>	<b>6.413.390</b>	<b>6.782.657</b>
<b>Increase</b>	<b>%10</b>	<b>%6</b>	<b>%6</b>	<b>%5</b>	<b>%2</b>	<b>%1</b>	<b>%4</b>	<b>%6</b>

**Table 2-3: Subscription indicators by technology** (Source: ICTA)

increased competition through the privatization of its incumbent telecom operator (55% was sold to the private sector in August 2005) and implementing rules to increase competition such as providing competitors access to telephone lines.<sup>21</sup> Yet this policy was not transformed into increased competition and a high rate of growth in broadband infrastructure. Alternative operators accounting for only 7 percent, the level of competition in fixed broadband access is still very limited.<sup>22</sup>

As the National Broadband Vision (2010-2023) highlights, if Turkey wants to develop its broadband ecosystem rapidly and close the broadband penetration gap with advanced economies the government should follow an integrated and strategic approach in terms of broadband policy. <sup>23</sup> Waiting for growth in household demand for high-speed Internet access to encourage the development of broadband will take time. The public sector should consider taking a more pronounced role in stimulating the development of broadband infrastructure and using this capacity for modernizing the public sector.

### 2.3.2 Broadband technologies

Penetration data does not deliver enough information about the quality improvements in the broadband infrastructure. While the growth rate is slowing down there may still be

considerable internal changes as users upgrade their connections with faster speeds. This section helps to illuminate Turkish broadband development from a technological perspective.

#### 2.3.2.1 Backbone network

Until recently there have been two main technologies or platforms over which broadband services have been delivered to consumers. The first is Digital Subscriber Line (DSL) which entails upgrading the legacy public switched telephone network (PSTN). The second platform consists of the cable-modem technology, which entails upgrading the cable-tv network.

#### 2.3.2.2 Local access technologies

There has been an impressive shift away from dial-up Internet connections to broadband. In 2005, dial-up connections still accounted for 40 per cent of fixed Internet connections but had already fallen to just 10 percent by 2010.

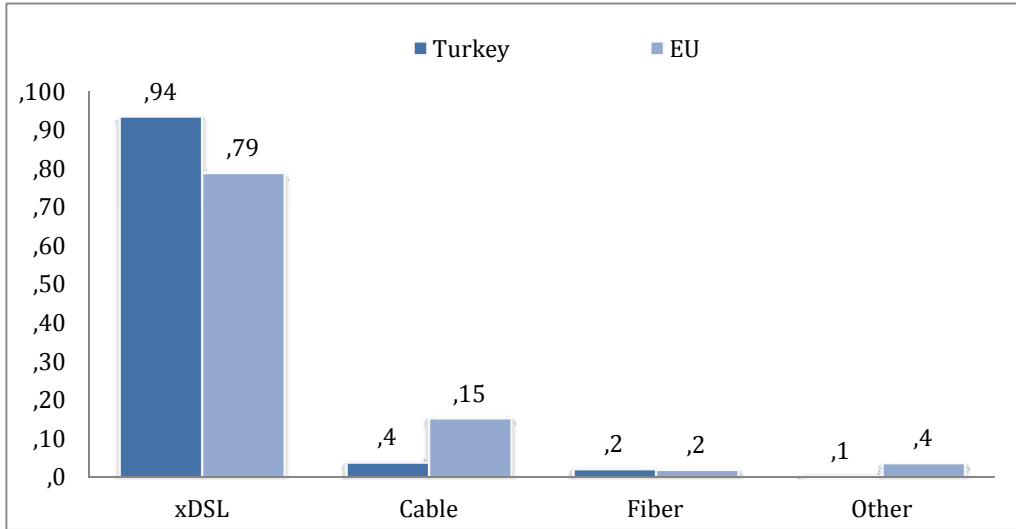
In Turkey, xDSL is the most widely used technology accounting for 94 per cent of broadband subscribers.<sup>24</sup> While 3.9 percent of the subscribers use cable networks and 2 percent of subscribers have fiber technologies for broadband access the number of xDSL subscribers has touched to 6.6 million by end of 2010. When compared to EU countries Turkish broadband is relatively far more concentrated on conventional technologies like xDSL.

<sup>21</sup> In March 2010, Oger Telecom declared its interest in acquiring an additional share of the Government's stake in TT. The Turkish Government plans to divest a further 15-20 per cent of its stake via an initial public offering. The remaining 15 per cent stake in the operator is already listed on the Turkish stock exchange.

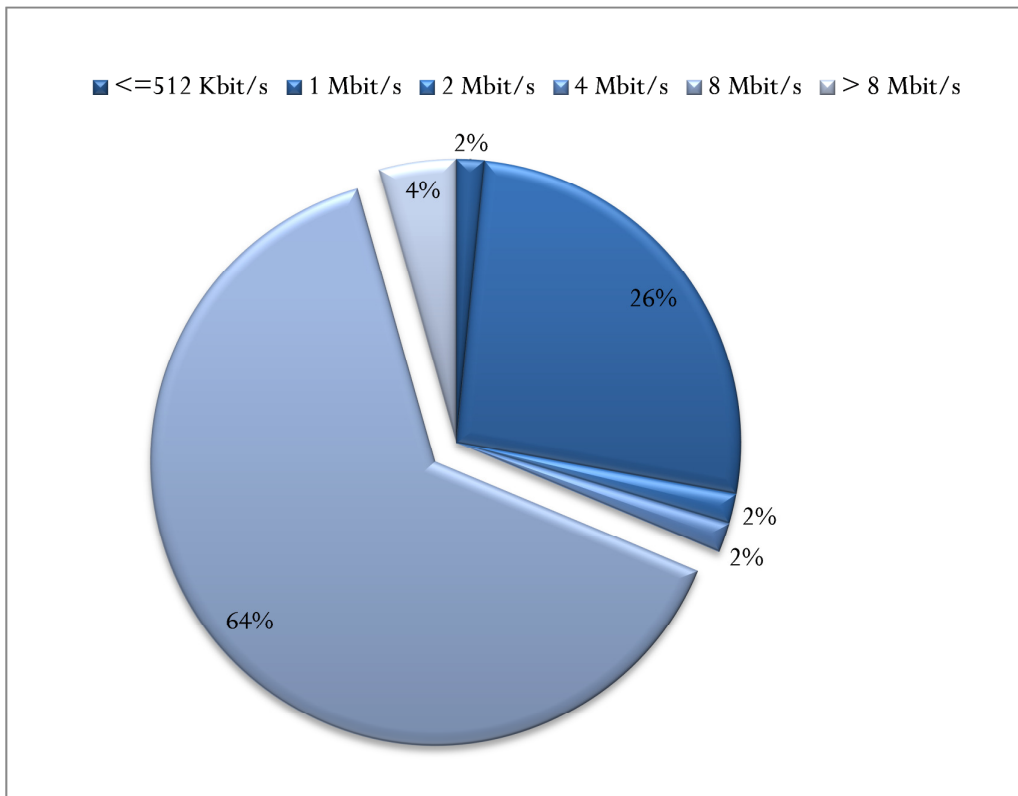
<sup>22</sup> Source: SPO (2010) Information Society Statistics.

<sup>23</sup> Office of the Prime Minister (2010) National Broadband Vision, Forthcoming.

<sup>24</sup> ICTA (2009), Electronic Communication Sector in Turkey, Market Statistics Report, February 2010, p. 20



**Figure 2-4: Technological configuration of broadband infrastructure, as percentage shares, 2010** (Source: author)



**Figure 2-5: Breakdown of fixed broadband subscribers by access speeds, 2010**

According to the recent data there has been a rapid shift away from lower speed connections.<sup>25</sup> The great majority of ADSL subscribers (64

percent) have an 8 Mbps connection. The share of the subscribers who have 1 Mbps connections has decreased dramatically from 42% to 26% in just six months of 2010.

<sup>25</sup> Source: Information and Communication Technologies Authority (2010), Communications Market Report, Ankara (In Turkish).

The incumbent Turk Telekom (TT) provides landline, mobile and Internet services. It launched ADSL services in 2003, and currently offers Internet services in selected regions through its subsidiary TNet. In 2005 in a drive for privatization, the government sold a 55 per cent stake of TT to the Saudi-owned Oger Group. In March 2010, Oger Telecom declared its interest in acquiring an additional share of the Government's stake in TT. The Turkish Government plans to divest a further 15-20 per cent of its stake via an initial public offering. The remaining 15 per cent stake in the operator is already listed on the Turkish stock exchange.

One of the key benefits of TT's privatization is the fact that it has lost the special status of a state-owned company and as a result is obliged to follow the same regulations as any other Turkish telecoms operator. TT is likely to remain aggressive within the telecoms marketplace and in the regulatory process as it tries to maintain its leading position. Thus, the low level of competition in the broadband internet is partly due to the strategic behavior of Turk Telekom to prevent the entry of alternative Internet service providers. In most countries incumbent operators such as Turk Telekom have been under the regulatory obligation of allowing new entrants to use the existing network to provide their own DSL service. In a landmark decision taken in November 2008, the Competition Authority has imposed a fine of 12.4 million TL (about €6.2 million) on Turk Telekom for abusing its dominance in the wholesale broadband Internet market through price squeeze in the retail Internet market. In its decision, the Competition Board stated that Turk Telekom and its Internet subsidiary TNet endured operating without profits for long periods of time and implemented campaigns that would not cover losses in reasonable amounts of time and that these strategies were executed in order to monopolize the sector. In a recent decision the Competition Authority stated that Turk Telekom should provide naked DSL services. Provision of naked DSL means that Turk Telekom can no longer bundle voice and data services together and that the subscriber can subscribe to DSL services alone, without having to pay for voice services as well.

In recent years Turksat with its UYDUNET cable services has increased its market share by winning some 274 thousand broadband customers as of 2010. However since the cable TV infrastructure is operational mostly in urban areas and lacking somewhat more effective business models the company has not made a major breakthrough in the domestic market.

Another striking development was the introduction of 3G services which had a significant impact on the broadband sector. The three mobile operators, Turkcell, Avea and Vodafone, are trying to find new sources of revenue in anticipation of the difficulties associated with increasing subscriber numbers in the saturating market. All three won 3G licences in December 2008 and launched 3G services at the end of July 2009. Avea allocated TRY 1 billion to be spent mostly on 3G network development during 2009. Vodafone followed suit with a TRY 1.3 billion investment allocation. At the end of December 2010, there were 1,448,020 mobile broadband subscribers, showing a 265 per cent growth over the last 12 months. At the end of 2010, the number of customers on 3G networks reached 19.4 million.

With the emergence of alternative network technologies TT is now under pressure for adopting a more business oriented strategy rather than enjoying its domination in the fixed market. TT introduced its new Internet speed package days before 2011 which enables speeds of up to 32 Mbps with VDSL2 and up to 8 Mbps through ADSL. TT shall begin offering packages with speeds of up to 50 Mbps and 100 Mbps with VDSL2 technology, and shall increase the speed up to 16 Mbps with ADSL2+.

TT will need to work hard to retain its market dominance however, as mobile operator Turkcell is investing in considerable fibre infrastructure through its subsidiary Superonline. Vodafone Turkey also bought a major alternative operator in late 2009. Another point is that EU candidacy is prompting Turkey's telecoms regulator to strengthen the regulation of the sector and curtail TT's monopolistic powers.

#### **Box 2-2: Leveling the field: The battle of broadband in national market**

(Source: Atiyas Izak (2010) Regulation and Competition in the Telecommunications Industry: An Update; and interviews with Dr. Ramazan Altinok, Dr. Ertugrul Karacuha, Emin Sadik Aydın, Furkan Civelek, Ahmet Hasanbeseoglu and Ugur Terzioglu)

Turk Telekom is leading provider of DSL and owns all of fixed telephone infrastructure (16 million connections in 2010). As of 2009 the share of alternative operators reached to 6.3%. Compared to the previous year, alternative operators' subscriber number increased by 29%. Currently two types of Local Loop Unbundling (LLU) namely 'full access' and 'shared access' have been implemented in Turkey. 163 central offices have been opened to access of alternative operators by the end of 2009 under the LLU regulations of the Authority. Currently alternative operators have technical access to almost 7 million PSTN and 2.6 million ADSL subscribers via the above mentioned 163 central offices. Besides LLU, operators can offer broadband Internet access services to their customers using Turk Telekom's other wholesale broadband access services such as xDSL simple resale and xDSL bit-stream access (BSA) which enable ISPs to access the fixed broadband network at different levels. Some promotional campaigns including LLU in the above mentioned wholesale access services have been approved by the Authority upon Turk Telekom's proposal in 2009.

Co-location areas and problems encountered at central offices opened to access have been observed within the central office surveys carried out in June. Moreover the outdoor DSLAM implementations of the incumbent operator are also observed.

In accordance with the relevant legislation and regulations, a Reference xDSL Resale Offer has been offered to the Authority by Turk Telekom at the end of June 2009. The public consultation process regarding to the draft offer has been completed and approval procedure of the reference offer is ongoing. Besides, some new re-sale tariffs proposed by Turk Telekom have been included in the existing offer upon approval by the Authority. In this context, ADSL 2 Mbit/s with 4 GB quota, ADSL 8 Mbit/s unlimited, MEB ADSL 2 Mbit/s, 4 Mbit/s unlimited, ADSL up to 8 Mbit/s unlimited, with 4 GB and 6 GB quota, ADSL 512 Kbit/s with 512 MB quota and ADSL2+ 16 Mbit/s unlimited resale tariffs have been approved in 2009 and included in Turk Telekom Reference xDSL Resale Offer.

Mobile broadband offers a competitive alternative to fixed broadband. Turkcell, Avea and Vodafone, the three operators in mobile segment had authorization from the government to provide 3G services as of December 2008,

and became operational by July 2009. Since then mobile broadband subscriptions recorded an explosive expansion. With some 1.45 million subscriptions (December 2010) and a growth rate of 265 percent, mobile broadband holds great promise for Turkey, particularly given the limited competition on the fixed market. Mobile broadband provided over the UMTS platform with HSPA extensions came relatively late to Turkey. The 3G market is benefiting from the deployment of HSPA technology and by the introduction of new smartphones. Growth has been dramatic and mobile broadband accounted for 17% of all broadband subscriptions by the end of 2010.

Though the level of competition in fixed broadband is limited compared to more advanced economies, with a broader definition of broadband including the mobile segment, Turk Telekom as the incumbent operator is losing its market share rapidly. TT's broadband market domination has been somewhat challenged by mobile operators' (Turkcell, Avea and Vodafone) success in targeting mobile broadband customers and partly due to increases in cable and fiber subscriptions. TTN's market share in the broadly defined broadband market was down from 93% to 71% since early 2009. By contrast the market share of mobile broadband operators grew explosively up to 17% following the opening of 3G services in the country. It is estimated that mobile broadband subscribers will occupy an increasingly prominent place in Turkey's broadband sector. These are broadband customers who use devices such as netbooks, smartphones and USB sticks to connect to the Internet wirelessly via a high-speed (3G/HSPA) network. The share of cable network operator Turksat has also augmented from 1.3 % to 3.2 % during the last two years and fiber connections expanded their share from 1% to 1.8 % since early 2010 (Figure 2-6).

Turksat provides both satellite and cable television services. It has around 1.2 million cable television subscribers.<sup>26</sup> Turksat has upgraded its networks and made cable broadband services available to the majority of homes in urban areas. Nonetheless the cable network is in its takeoff phase and needs an effective management model for further expansion. The Turksat "Uydunet" service provides its subscribers with broadband Internet access through its cable infrastructure at speeds

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<sup>26</sup> <http://www.turksat.com.tr/english/v2/cable-services>



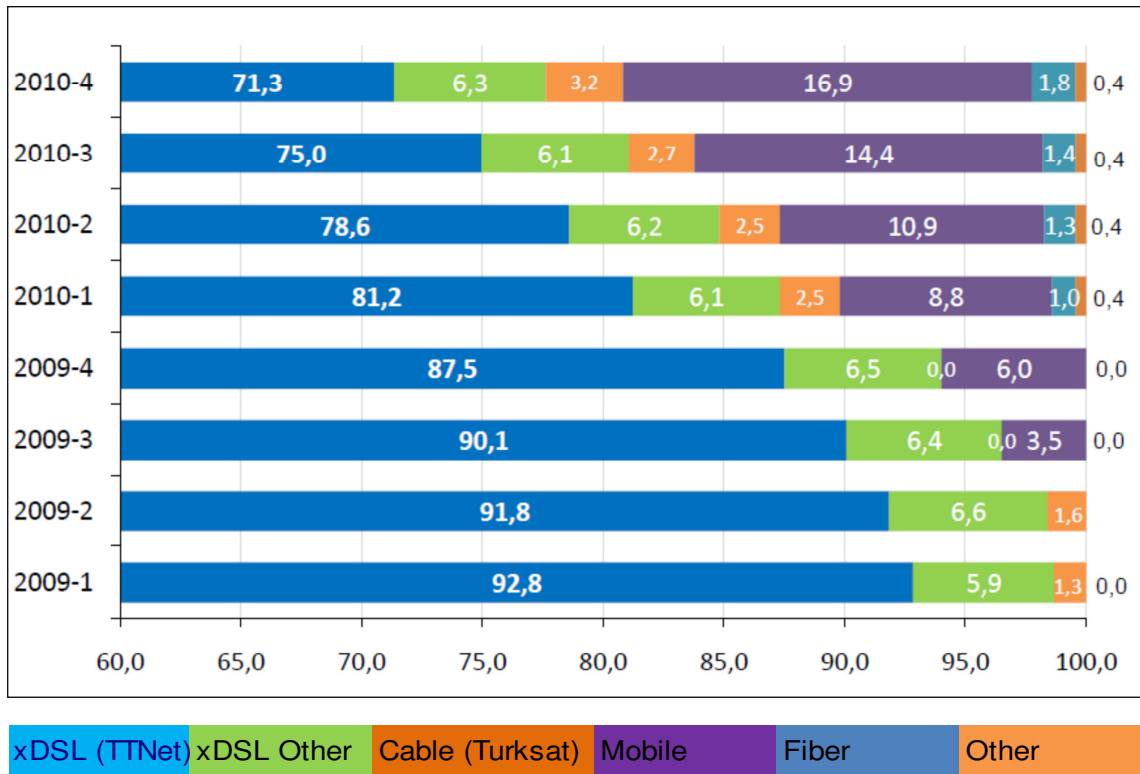


Figure 2-6: Shares of technology in total broadband subscriptions, percent, 2010

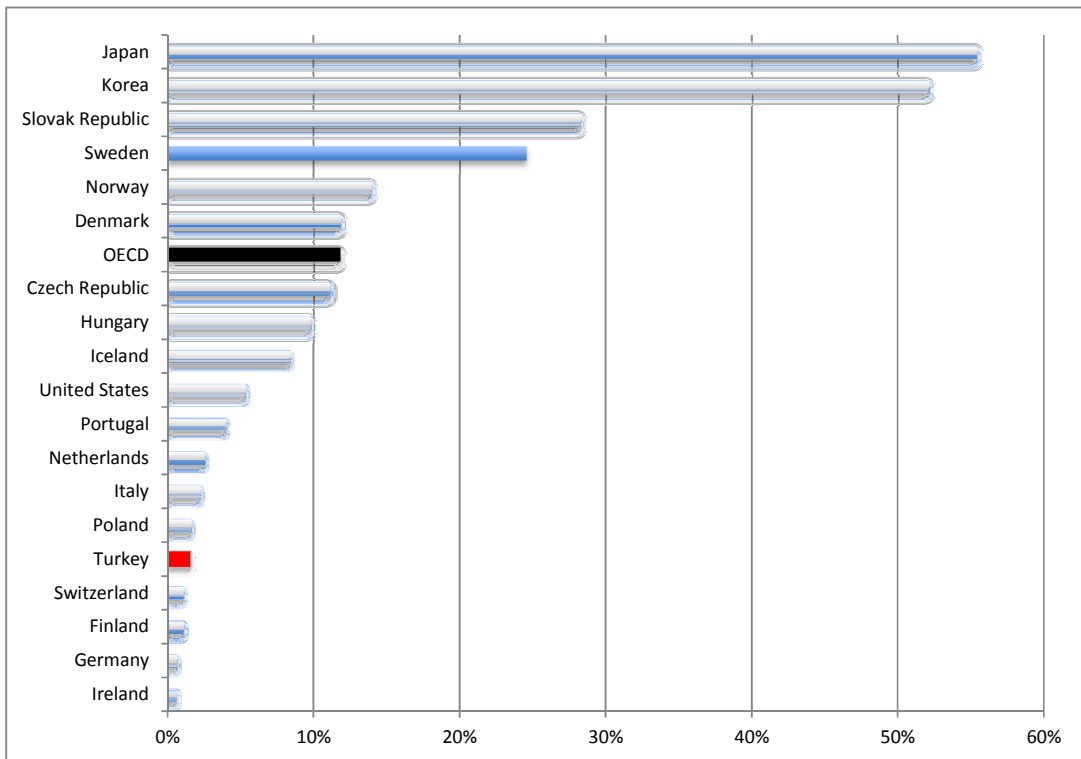


Figure 2-7: Percentage of fibre connections in total broadband, June 2010 (Source: OECD)

ranging from 1 Mbps to 20 Mbps. One challenge for expanding cable broadband access is that most TV subscribers in Turkey have a preference for satellite delivery (some 10 million satellite dishes in mid-June 2010).<sup>27</sup>

Fiber networks are ideal because the capacity is much higher than traditional copper lines and relatively easy to expand once the fiber is in place simply by adding additional lasers to a line. When compared to advanced Asian and European economies Turkey lags in fiber broadband penetration (Figure 2-7). However the recent expansion in fiber subscriptions is very promising and it indicates the demand for high bandwidth network access could possibly be ready in the country. During 2010, the share of fiber subscriptions in the total broadband market reached 1.8 percent.

In terms of technology deployment, though there have been outstanding market developments that reflect the overall potential in demand and supply sides, the majority of Turkish broadband infrastructure is based on traditional forms of connectivity devices which do not allow high bandwidth data services such as advanced e-health and multichannel television. Turkey shifted from a dial up network structure to a broadband dominated one at a very rapid pace. Turkey's fiber Internet backbone provides for high-speed connections, but this has not translated to a high number of broadband users.

In the long run the leading policy challenge for the government would be facilitating the development of high speed broadband networks most notably fiber. High-speed broadband has strategic importance and should be promoted. Much as traffic expands to fill roadway capacity after the building of superhighways, having more broadband capacity will likely facilitate the delivery of government e-services, provide a foundation for e-government in whole sectors of government, and stimulate the development of e-business. Besides the recent rapid shift into high bandwidth subscriptions and explosive growth in mobile and fiber segments indicate that the future demand for broadband ecosystems will be strong. Turkish universities have already developed their own broadband network, as has the National Adjudication Network Project (UYAP). The e-health initiative

is proposing to build its own network for exchanging data.

The lack of a complete and strategic approach would impair this great opportunity. There are signs of a better understanding emerging in government circles. The National Broadband Vision has urgently called on the public and private sectors for the development of a holistic government approach to broadband. SPO is getting ready to update the nation's Information Society Strategy and disclosed publicly that it shall prepare a separate chapter on broadband. A more organized approach should prepare for harder policy designs to broadband challenges and ensure competition in the national broadband market since it is the best option and the main driver of continuous improvements.

The Turkish government should also ensure a more effective regulative approach for broadening competition in the broadband market. The development of competition in broadband has been extremely slow, primarily because the Ministry of Transport and the Information and Telecommunication Technologies Authority have been slow in adopting, implementing and enforcing the necessary secondary legislation. Analysts argue that Turk Telekom's influence on the Ministry and the Information and Telecommunication Technologies Authority's lack of full independence from the Ministry are to a large extent responsible for this state of affairs.

### 2.3.3 Prices

Prices are a crucial indicator in evaluating the state of broadband development in any given country. Analysis of prices, the level of service, and the range of choice available to users, can help inform questions about the take-up and use of broadband services as well as in assessing how competitive broadband access is in individual markets. While there is still not enough data to systematically examine price and performance changes, the trend in prices is very much downward; and the trend in performance is upward. Competition is the main driver of improvements in price and performance.

International comparison suggests that prices of broadband services in Turkey are among the highest in OECD and EU economic areas. The average broadband monthly price per advertised Mbit/s in Turkey is about 40 percent higher than the OECD average. When prices are corrected for purchasing power parity, prices in Turkey are the highest (). Turkey is also lagging behind in

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<sup>27</sup> <http://www.eutelsat.com/products/broadcast-audience.html>

high-speed connectivity prices. Prices in Turkey are relatively cheaper for low speed connections and relatively more expensive for high-speed connections.

Presenting the latest situation as of March 2011, Table 2-2 confirms that high prices and affordability are among main concerns in Turkish broadband market. Turk Telekom offers DSL services with different speed options. The baseline ADSL offer at 1 Mbps costs US\$ 13.2 per month with a 1 GB cap on data transfer. Higher speed services are much more expensive than EU countries. The highest speed 100 Mbps service is priced at US\$ 94.3 per month with unlimited data option and a fiber 32 Mbps service costs US\$ 27.2 per month with a 10 GB Cap. Turk Telekom's ADSL2+ 16 Mbps services are priced at US\$ 37.3 and USD 20.9 with unlimited and 5 GB Cap respectively. Turk Telekom also offers ADSL technology to consumers with the highest speed option 8

Mbps going from US\$ 69 per month with unlimited data transfer and decreasing prices for more limited speeds and data cap options.

Among independent ISPs offering broadband Internet services, Superonline provides DSL and fiber Internet access with different speed options. The baseline starts with a 1 Mbps speed service at USD 28.7 with unlimited data transfer, and 8 Mbps speed option goes from USD 24.7 and USD 18.3 with 6 GB and 4 GB Cap respectively. Among fiber connections the highest option is 100 Mbps costing USD 125.9 with unlimited data transfer.

As the largest cable TV service provider, Turksat runs its Uydunet to offer broadband services at different speed options. The baseline is the 1 Mbps speed service costing USD 18.3 per month with unlimited data transfer. However higher speed services are priced relatively higher than the average ADSL services. The 10 Mbps option costs USD 62.6 and the 20 Mbps service

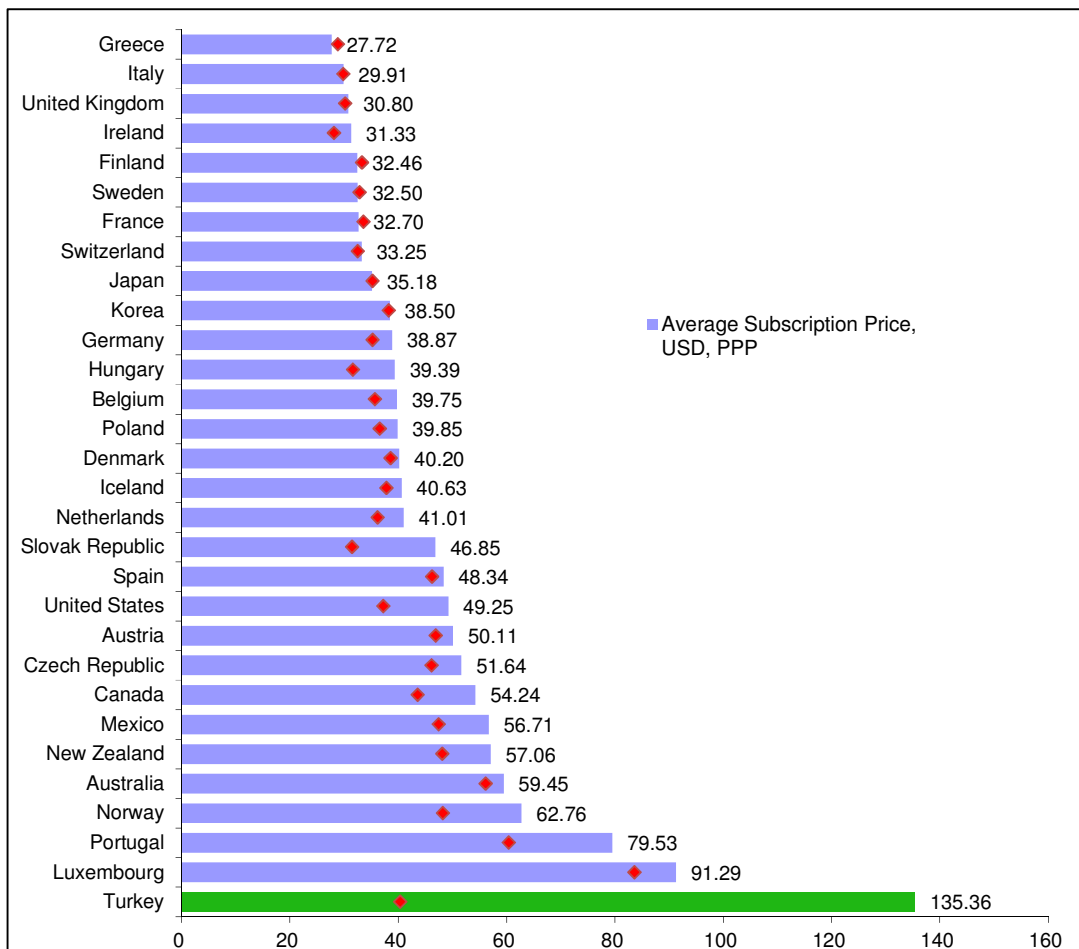


Figure 2-2: Broadband average monthly subscription price, Oct. 2009, USD PPP (Source: OECD)

Operator	Technology	Speed (Mbps)	Price per month (TRY)	Price per month (US\$)	Price per Mbps (US\$)	Note
TTNet (TTelekom)	ADSL	1	20,9	13,2	13,2	1 GB Cap
TTNet (TTelekom)	ADSL	<=8	29	18,3	2,3	4 GB Cap
TTNet (TTelekom)	ADSL	<=8	32	20,2	2,5	6 GB Cap
TTNet (TTelekom)	ADSL	8	109	69,0	8,6	Unlimited
TTNet (TTelekom)	ADSL2+	<=16	33	20,9	1,3	5 GB Cap
TTNet (TTelekom)	ADSL2+	<=16	59	37,3	2,3	Unlimited
TTNet (TTelekom)	Fiber	<=32	43	27,2	0,9	10 GB Cap
TTNet (TTelekom)	Fiber	<=100	149	94,3	0,9	Unlimited
Superonline	ADSL	1	45,3	28,7	28,7	Unlimited
Superonline	ADSL	<=8	29	18,3	2,3	4 GB Cap
Superonline	ADSL	<=8	39	24,7	3,1	6 GB Cap
Superonline	Fiber	<=50	59	37,3	0,7	12 GB Cap
Superonline	Fiber	<=100	199	125,9	1,3	Unlimited
Uydunet (Turksat)	Cable	1	29	18,3	18,3	Unlimited
Uydunet (Turksat)	Cable	<=10	99	62,6	6,3	Unlimited
Uydunet (Turksat)	Cable	<=20	199	125,9	6,3	Unlimited
Turkcell	HSDPA	7,2	29	18,3	2,5	1 GB Cap
Vodafone	HSDPA	7,2	30	19,0	2,6	1 GB Cap
Avea	HSDPA	7,2	29	18,3	2,5	1 GB Cap

**Table 2-4: Prices of selected broadband service packages in Turkey, March 2011**

(Direct source inquiry to author)

costs USD 125.9 per month without any cap on data transfers. Prices per Mbps offered are significantly higher than ADSL operators.

The three mobile operators, Turkcell, Vodafone and Avea are also offering mobile Internet services based on HSDPA technology and there are quite differentiated service packages for consumers. Table 2-4 presents a selection of these mobile packages most notably the baseline options. All three operators offer 1 GB cap mobile data options at around USD 18-19 as of March 2011.

Since the competition in fixed broadband market has been relatively limited in Turkey, the general downward trend in prices seems to be somewhat partial. The effect of taxes on broadband service pricing is another significant variable in assessing the affordability and performance of the market. As part of the need to augment the tax base during the economic crises of 2000-2001, Turkey raised taxes on telecommunication services. While these measures have increased tax revenues, they had a negative effect on e-services take-up. In 2008 the government considered ways to increase the affordability and thereby the use of e-services by reassessing telecommunication taxes but little has been achieved.

The tax rate applied for broadband products and services include the 18% Value Added Tax (VAT) and an additional 5% Special Communication Tax (SCT) calculated over the

price of the related service including VAT. Compared to the other communication services, Internet services are taxed relatively lower: SPC rates on mobile and fixed line communication services are 25% and 15% respectively. Though taxes on Internet services are relatively low the fiscal burden still accounts for a major impact on a middle-income household.

One can expect that when Internet access requires a lower share of monthly per capita income, usage rates increase, everything else being equal. Internet access cost – measured as the Internet subscription cost as share of average monthly income – relatively high. According to analysts, middle-income consumers are generally ready for broadband packages costing less than 3 % of their per capita income.<sup>28</sup> In Turkey the Internet access cost of an average broadband package has come down significantly in recent years but still exceeds 3% threshold with a rate around 5%.

National growth performance has created opportunities for broadband expansion and service affordability. The high growth in per capita income in recent years affected positively the broadband affordability by increasing the denominator. It is clear that rising incomes have supported the market and affordability of

<sup>28</sup> Source: Interview with Ahmet Hasanbesoglu from Cisco.

broadband services in a country where competition was somewhat imperfect.

Internet use will likely increase significantly if the cost of accessing the Internet can be reduced. The government should prompt action to reduce taxes on both telecommunication and broadband services. On the supply side the Information and Communication Technologies Authority should continue to actively stimulate competition in the telecommunications sector to

promote faster and more affordable Internet access in line with EU initiatives in this area.

Mobile phones can provide an alternative, less expensive channel for delivery of e-services to citizens and businesses. Given the high number of mobile subscribers in Turkey, the government should consider this channel to provide information and services. In this regard a simple, flat and more affordable tax rate applied to communication services could be a good and less distortive option.

## 3 Applications

Government policies should ensure not only development of broadband infrastructure but also have to ensure that broadband technologies are adopted and used increasingly by the country's businesses, households and public sector. The previous sections of the report focus on penetration, price, and speed of high bandwidth Internet networks in Turkey and highlight how the country tried to promote competition and encourage investment in order to increase connectivity. This part presents the content and applications created by private, civil and public agents over broadband platforms.

### 3.1 Government

The period of 2000-2010 can also be called the era of e-government in Turkey. The negotiation process with the EU and the rule of a single party government helped public agencies to design and manage more concerted efforts on e-government applications and infrastructure. Since then Turkey has made strong progress in implementing e-government. The number of services integrated with the e-Government gateway reached 139 (6 fold increase in one year) and the number of visitors increased over half million people (50 fold augmentation in one year) in 2010. While the central government allocated US\$ 267 million for 203 e-government projects in 2002, the public investment budget rose to US\$ 590 million for 244 projects in the pipeline in 2010. The number of web sites to provide access for public services grew explosively during this period and as of 2010 the total number was above 20 thousand (Figure 3-1).

The share of services provided through electronic channels in total public services reached 66% and the e-services user satisfaction rate was recorded as 95% in 2009. In a benchmarking study conducted by the EU in 2007<sup>29</sup>, the maturity level of 20 basic public services in Turkey scored very much near the EU average and even overtaking slightly the EU score in the business services segment (Figure 3-2).

Table 3-1 presents leading e-government applications implemented in Turkey. These

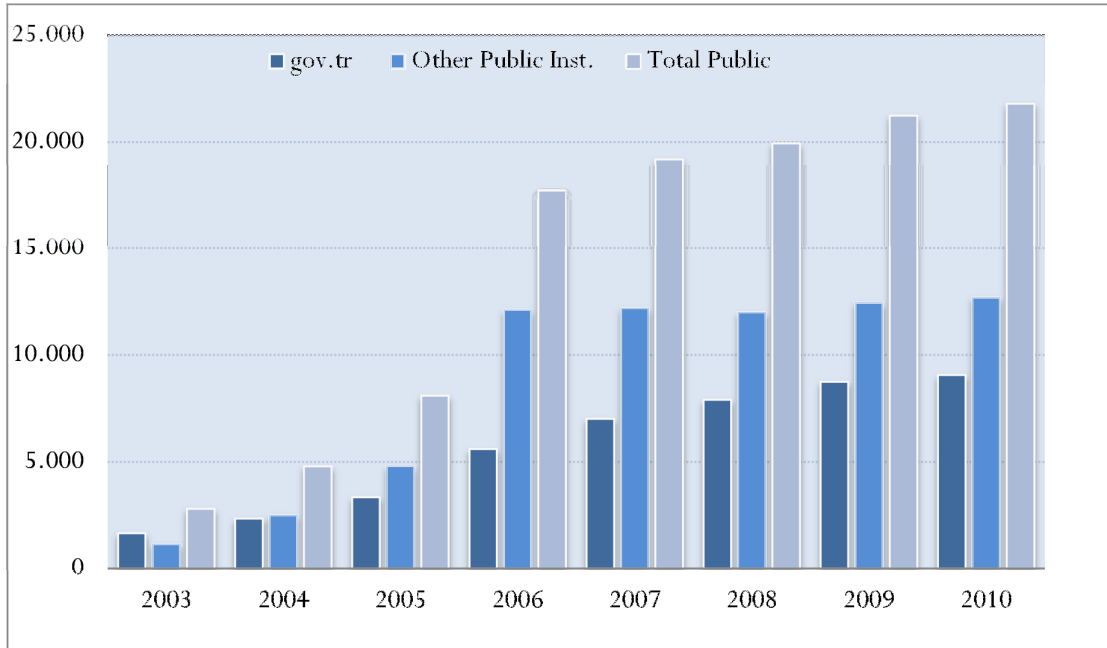
projects have been enablers of e-government and e-transformation in the Turkish public sector. Many of the projects are high volume and high value ones with important transactions on a daily basis such as MERNIS and UYAP. Turkey has also demonstrated good progress in terms of electronic tax returns. The Internet Tax Office has become operational and started to accept declarations and payments online. The Custom Modernization Project, one of the long waited initiatives, finally completed in this period and became effective in 2009. E-government applications also include some public portals to provide up to date information to targeted audiences or to the broader public. The Turkish Foreign Investment Portal, KOBINET and Tourism Portal are examples in this regard.

In the last ten years Turkey has made strong progress to develop e-government applications and infrastructure. Some main findings and policy lessons could be drawn from this transformation process to inform similar countries:

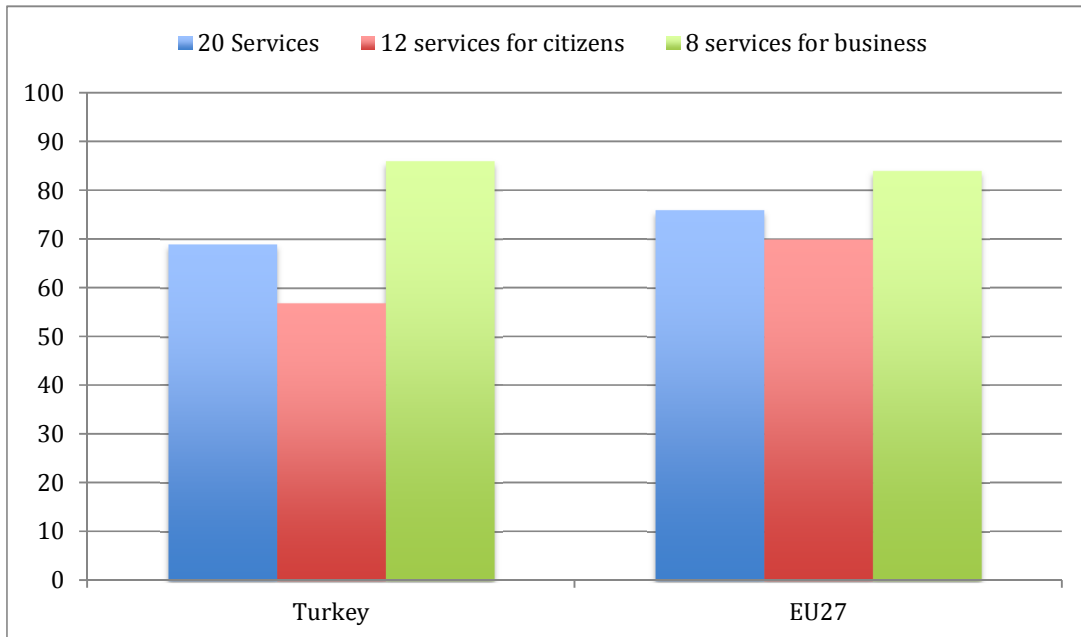
- Strong political leadership: One of the reasons for the rapid development of e-government in Turkey is its strong support within the high-level political leadership. E-government leadership is provided by the e-Transformation Turkey Executive Board, chaired by the Deputy Prime Minister. The new government's modernization agenda considers e-government as a major tool for change.
- Effective organizational management: In terms of planning, financing and monitoring functions The Executive Board is aided by the State Planning Organisation (SPO), which is responsible for scrutinizing all public investments. From a broader perspective the SPO has provided necessary technical and organizational services to develop, implement and monitor a coherent strategy for e-transformation in the public sector organizations.
- A strategic approach to e-government: Together with line ministries and private sector agencies these organizations

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<sup>29</sup> European Commission. 2007. The User Challenge Benchmarking The Supply Of Online Public Services. [http://ec.europa.eu/information\\_society/eeurope/i2010/docs/benchmarking/egov\\_benchmark\\_2007.pdf](http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/egov_benchmark_2007.pdf)



**Figure 3-1: Number of public sector owned websites**



**Figure 3-2: The maturity level of selected public services, percent, 2007** (Source: European Commission 2007. The Use Challenge Benchmarking The Supply Of Online Public Services)

Project	Explanation	Web pages
E-Government Gateway	Launched in December 2008, one stop shop, integrated, multi-channel (internet, mobile, call center) service delivery platform for identification and payments. Mobile portal launched in October 2009 currently 139 public services are integrated.	<a href="http://www.turkiye.gov.tr">www.turkiye.gov.tr</a>
Central Census Management System (MERNIS)	Unique ID number for all citizens (over 130 million records)	<a href="http://www.nvi.gov.tr">www.nvi.gov.tr</a>
Identity Sharing System (ISS)	ID data sharing platform through web services. More than 2,500 agencies, both public and private, signed 19 protocols to use the system. PM Circular dictates public agencies do not require citizens to submit ID records and address information and obliges them to acquire this information through ISS.	<a href="http://www.nvi.gov.tr">www.nvi.gov.tr</a>
Address Record System	Citizens address records are integrated with MERNIS through ID numbers.	<a href="http://www.nvi.gov.tr">www.nvi.gov.tr</a>
National Judiciary Informatics System (UYAP)	Aims to ensure fast, reliable and robust judicial system. Comprises all of the courts, public prosecutors, prisons, other judicial institutions and other government departments. Serves to some 40,000 officials and judges, 66,000 lawyers and for all citizens. Litigate online case, reach and examine case information. Informs citizens on their cases through SMS. Ministry of Justice announces 2.7 billion € savings with applications of UYAP.	<a href="http://www.uyap.gov.tr">www.uyap.gov.tr</a>
Internet Tax Office	Online tax declarations and payments. Online payment of motor vehicle taxes and traffic fines. 99 % of tax returns are declared online. OECD study shows unit cost of tax revenue collection decreased from 2 \$ to 0.35 \$.	<a href="http://www.gib.gov.tr">www.gib.gov.tr</a>
Police Network and Information System (POLNET)	Covers 684 locations. Internal applications (26 main applications, 51 search programs and 26 local applications) and some online applications: passport application, driving license (application and information on penalty points), denounce on public order and security, search for lost persons.	<a href="http://www.cgm.gov.tr">www.cgm.gov.tr</a>
Informatics Sector Association	TUBIDER IT Sector Association was founded in November in 1999 so as to protect rights and interests of the IT companies operating in the informatics sector and to ensure vocational regulations are implemented. TUBIDER continues its operations having reached to 800 registered members and more than 1500 applicants.	<a href="http://www.tubider.org.tr">www.tubider.org.tr</a>
Accounting Office Automation Project (Say2000i)	Network for communication and data transfer for over 6,000 users in 1,660 auditing branches and 39,500 budget offices throughout the country. All financial transactions are processed online and monitored real-time.	<a href="http://www.muhasabat.gov.tr">www.muhasabat.gov.tr</a>
Customs Modernization Project	Facilitates legal trade and prevents illegal trade by using ICT. Customs formalities are carried out in a computerized media in real-time. 100% of customs transactions are processed electronically. Around 6.3 million import and export declarations were processed by using this system in 2009.	<a href="http://www.gumruk.gov.tr">www.gumruk.gov.tr</a>
Social Security e-Declaration Project	Social security premiums of employees are declared online. People pay the premiums electronically, verify payments made and outstanding balance. More than 90% of firms process declarations online.	<a href="http://www.sgk.gov.tr">www.sgk.gov.tr</a>
Turkish Foreign Investment Portal	Guide for foreign investors on: starting a business, cost of doing business, taxes and incentives, special investment zones, demography and labor force, business environment and business legislation, infrastructure, economic outlook, Investment Support and Promotion Agency assists investors in Arabic, Chinese, English, French, German, Italian, Japanese, Korean, Russian, or Spanish as well as Turkish.	<a href="http://www.invest.gov.tr">www.invest.gov.tr</a>
KOBINET for SMEs	Provides information about business environment (marketing, management, taxes, human resources, internet and technology, finance, insurance and labor regulations). Information about firms, online business opportunities, 22,915 members. Provides user ID, password, e-mail address, web pages in 7 languages as free of charge.	<a href="http://www.kobinet.org.tr">www.kobinet.org.tr</a>
Tourism Portal	Provides information on history, heritage, life-culture, travel guide, where to go and business.	<a href="http://www.goturkey.com">www.goturkey.com</a>
Electronic Signature and Certification Authority	Electronic Signature Law is effective since 2004. Electronic signature has the same legal effect as that of a handwritten signature. Public Certification Authority (PCA) for public agencies. 3 private electronic certificate service providers	<a href="http://www.kamusm.gov.tr">www.kamusm.gov.tr</a>
Mobile Electronic Signature	Introduced by a Turkish GSM operator. Initial applications in banking, customs, justice and some local administrations.	<a href="http://www.btk.gov.tr">www.btk.gov.tr</a>

**Table 3-1: Major e-government applications in Turkey** (Source: Author's compilation)



managed to develop a shared vision and a focused strategy including quantitative targets for outputs and outcomes in order to make e-government happen.

- **Prioritizing projects:** Instead of creating many e-government services Turkey with a clear focus, has managed to prioritize projects that have high volume and high transactions: e-procurement, making social security and health payments, and collecting customs, tax and social security payments etc. This selective list also included projects to establish e-government infrastructure and ICT network platforms to enable provision of e-services.

On the supply side the main challenge for Turkey now seems to be improving Internet access and broadband development. Turkey's basic communications infrastructure is the telephone line network and the country clearly needs alternative technologies such as fiber networks for next generation broadband services. Internet access costs remain high causing the penetration rates to go flat. Public policy should assume a more pronounced role in terms of ensuring broadband infrastructure development.

Another supply side challenge is increasing the capacity of line ministries and local governments to develop and implement e-government within their respective sectors and in their subordinate agencies. A strong case is needed to make for co-operating rather than developing solutions in isolation. As e-government applications proliferate and the number of projects in the pipeline augment Turkey needs to transform its centralized organizational setup in e-government to a more horizontal and participative one.

An early study conducted by OECD (2001)<sup>30</sup> defined lack of ICT skills as a hidden threat to e-government and e-transformation. Turkey's e-government infrastructure and applications are relatively more advanced than her ICT skill base in public offices. To transform the government by means of e-government Turkey should focus on building appropriate skills and ensure people are willing to work in the public sector.

On the demand side, the results of the Household and Enterprise Use of Information

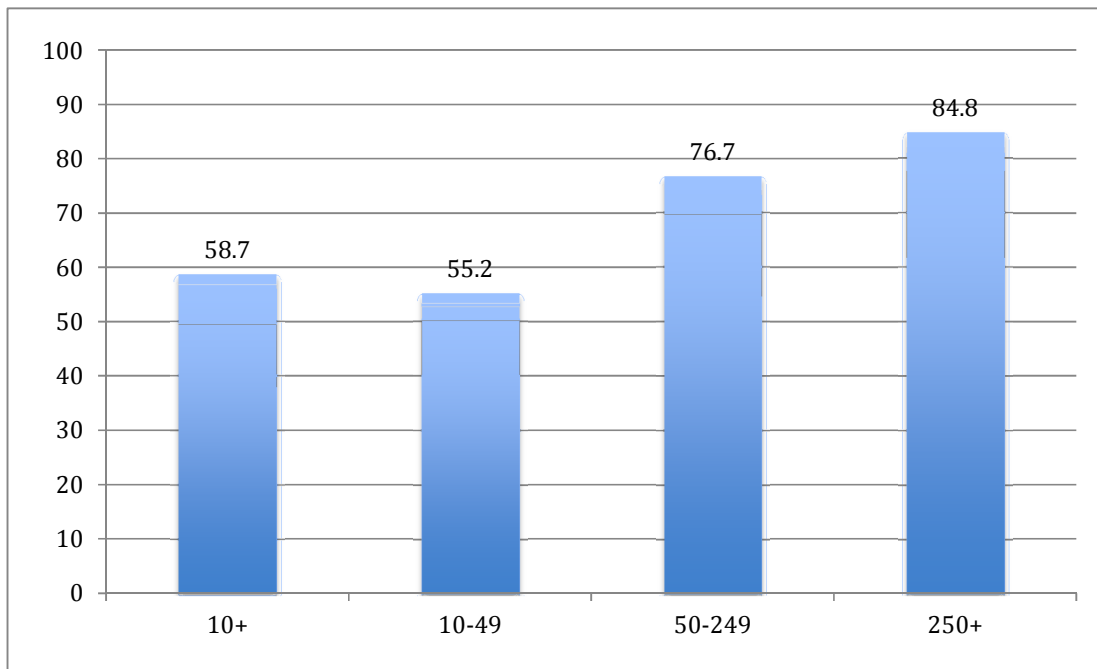
Technologies Surveys carried out by TURKSTAT provides information regarding access to and use of online public services by citizens and enterprises. According to these results, enterprises use public web pages more than the household sector. As of 2008 while 68% of the surveyed enterprises responded that they use public web pages to get information only 26% of households replied the same question positively. During their visit to the public web pages, 91% of households spent time by getting information, 30% by downloading forms and 34% sending information and uploading forms in 2009. With a 92% response share, getting information is among the leading motivation for enterprises visiting public sector web portals. 83% of enterprises get involved in downloading forms whereas 70% responded positively that they filled and sent some forms through web sites. More interestingly 7% of enterprises submitted proposals for public tenders via public web portals.

Individuals who do not visit public web pages responded that the preference to carry out transactions face to face in public offices seems to be the chief reason for not using e-government services. 19% of the group replied the unavailability of online services has prevented them to use public web sites frequently. Likewise 74% of the enterprises not preferring to use public web sites state the major reason for this behavior to be the preference to meet face to face. 44.2% give the reason as the unavailability of the required services online whereas another 36.1% report delays of feedback. Surveys indicate that enterprises need more sophisticated services and the demand for e-government services becomes more developed in the case of business transactions with the public.

Another interesting finding is that a great majority of households and enterprises which do not prefer to use e-government applications report that they are motivated to meet face to face rather than making transactions online. This may be regarded as an indication of a cultural impact on the e-government applications since Turkish people are generally known to be socializers. However since broadband technologies have also transformed the social space and socialization process itself, the Turkish society seems to be in a period of continuing adoption to ICTs and e-government applications.

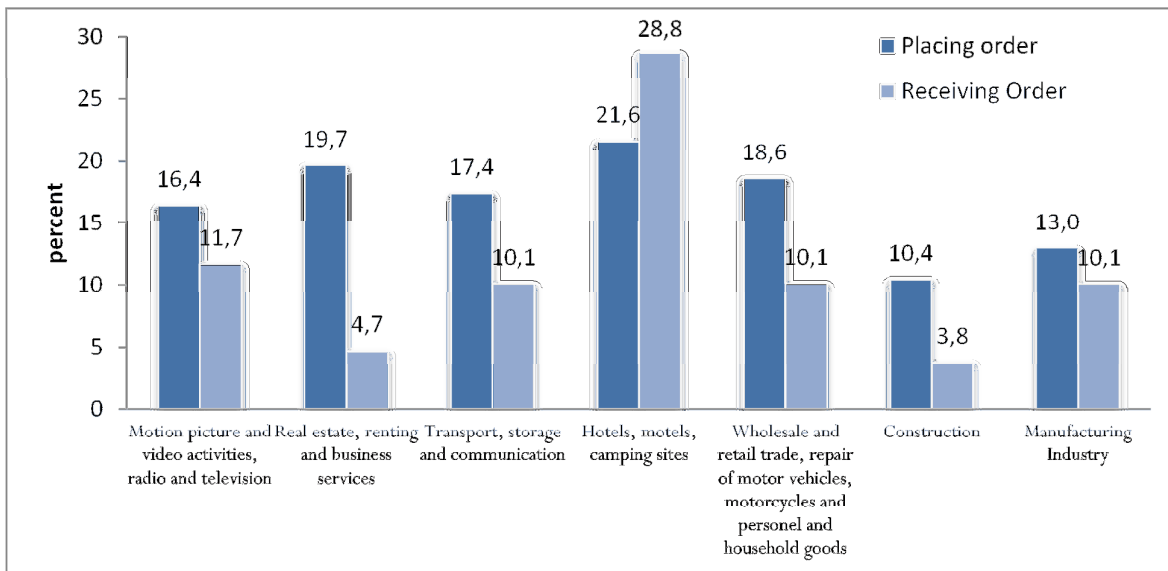
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<sup>30</sup> OECD (2001) The Hidden Threat to E-Government, Avoiding large government IT failures, PUMA Policy Brief No. 8.



**Figure 3-3: Ownership of web sites, by employment size of enterprises, 2009**

(Source: State Planning Organization Information Society Statistics, 2010)

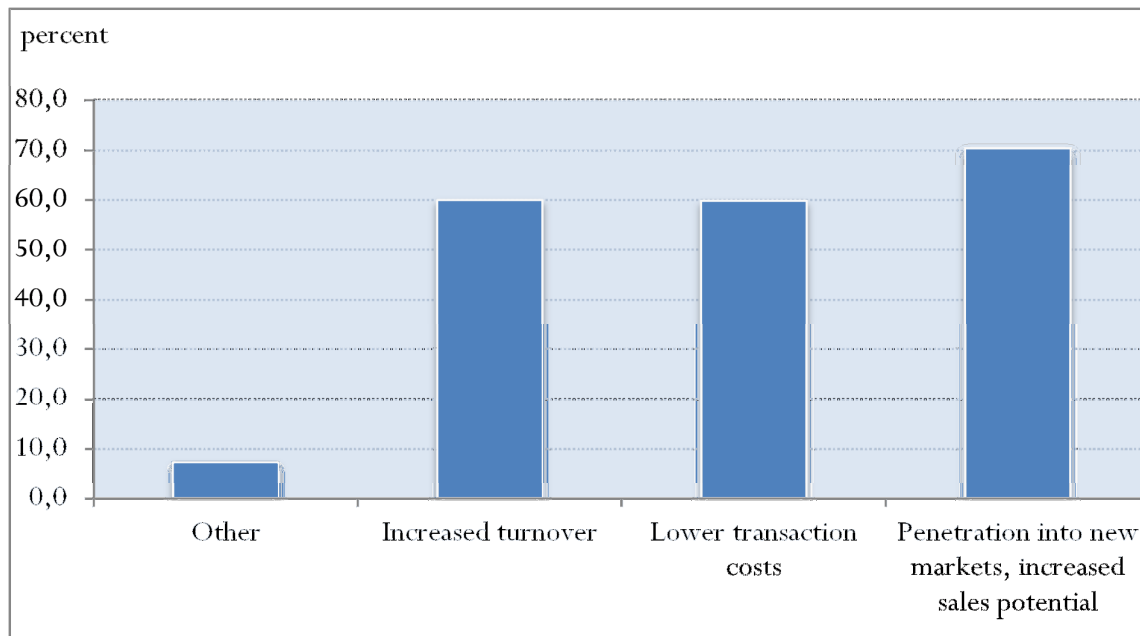


**Figure 3-4 E-commerce activities of enterprises by sector of activity, 2007**

Hence the chief policy challenge on the demand side is to provide and maintain good skill creation mechanisms and programs for increased ICT adoption by households and enterprises. Education policy should play a significant role through formal education and lifelong learning programs.

### 3.2 Electronic commerce

The abilities of enterprises to acquire, generate, and manage knowledge have become a main driver of economic growth. To do this, the adoption of ICT by business and its widespread and efficient use in enterprises has crucial importance. Electronic commerce (e-commerce)



**Figure 3-5: The benefits reported through e-commerce, 2008**

applications have been at forefront of this transformation process.

Within the group of enterprises employing 250 or more employees, 85% have established their own web sites in 2009 (Figure 3-3). In the group of enterprises with 50-249 employees, web site ownership ratio decreases to 76 % and in the group of 10-49 employees size, it further declines to 55%. The adoption of e-commerce is positively correlated to financial and managerial capacity of business units and Turkish enterprises have a growing interest in electronic commerce.

According to survey data by TURKSTAT, 77.9 % of enterprises have provided product catalogs and price lists through web sites. It is the leading form of e-commerce activity exercised by enterprises. In 2008 44.8 % of enterprises reported to engage in marketing of their products and services through internet and 28.4 % responded of giving after sales support services. The share of enterprises conducting online purchase order, reservation and registration transactions is 16.3 % as of 2008. As e-commerce activities get more sophisticated ability of adoption by enterprises is observed to decrease significantly (Figure 3-4).

E-commerce growth and adoption among Turkish enterprises is uneven and subject to significant variation among different sectors of economic activity (Figure 3-4). The leading

economic sector to adopt e-commerce has been tourism services. 21.6 % of hotels, motels and camping sites reported to place orders while 28.8 % of the same group reported to receive orders via internet. Real estate, motion picture and video activities, wholesale and retail trade and transport and communication sectors are among leading sectors in terms of enhanced e-commerce applications. More industry oriented activities such as construction and manufacturing, by contrast reported somewhat poorer adoption rates of e-commerce than service based sectors.

Banking and financial sector is an interesting example where e-commerce systems have been developed and embedded into business models rapidly. Sayar and Wolfe (2007) found that Turkish banks offer a wider range of services from their internet branches compared to British banks, despite the fact that the UK has a more favorable environment for internet banking in terms of the level of sophistication of its banking sector and technological infrastructure.<sup>31</sup>

While in most of the service-based industries the main motivation is to augment sales and increased market penetration, in the Turkish banking sector the main incentive is lower costs rather than increased sales. Analysts calculate

<sup>31</sup> Ceren Sayar, Simon Wolfe, (2007) "Internet banking market performance: Turkey versus the UK", International Journal of Bank Marketing, Vol. 25 Iss: 3, pp.122 - 141

that an Internet transaction costs a Turkish bank around 5% of the cost of the same transaction in a traditional bank branch.<sup>32</sup> Most of the larger commercial banks in Turkey offer Internet-based banking services. Other companies offer online services. The most active are airlines and retailers of books and electrical goods, largest supermarket chains also offer online services.

The data on benefits reported through e-commerce activities can also provide a good example in terms of assessing the relative degree of e-commerce adoption by Turkish enterprises (Figure 3-5). A great majority (70 %) of surveyed firms have responded that penetration into new markets and increased sales potential were the foremost benefits after engaging in e-commerce activities. Lower transaction costs and increased turnover with a 60 % response share each are among positive effects perceived by these firms. This clearly shows that enterprises are getting aware of the benefits offered by e-commerce applications.

There are also a number of challenges that limit increased adoption of e-commerce. According to the Survey data in 2008 enterprises reported to face following problems: Customers reluctance to use e-commerce applications (56.4 %), difficulty to adopt products and services into internet based commerce systems (55%), security issues during payment (48%), uncertainties in legal infrastructure of e-commerce (45.5%), technical issues and problems (42.4%), difficulties to reorganize business models (42.2%), and negative experiences on electronic sales (14.2%).

In other parts of the Survey, enterprises gave increased attention on security issues related to e-commerce applications. More than 17 % reported to experience some security problems during their electronic activities in Internet. There are also some indications that the share of enterprises having some problem on security issues is on the rise. Enterprises started to introduce necessary measures to overcome these challenges on two fronts:

- Having installed secure servers (94.9% of the group reported to have at least one server) and software (37.9 % reported to have installed firewalls).

- Having employed information specialists (48.6% of the group with 250 and more employees reported to employ information specialists) or even creating their own divisions for this purpose.

E-commerce is growing rapidly in both demand and supply sides. However the degree of adoption differs among enterprises significantly and the size of firms plays a major role in enhancing e-commerce applications. Larger firms with expanded financial and managerial capacity are in favorable condition to develop e-commerce solutions and online services. Smaller enterprises with fewer resources are finding difficult to get involved in these next generation commerce activities.

Government policies should address more rapid and balanced development of e-commerce applications in the enterprises sector. KOSGEB, the agency in charge of assisting small and medium-sized enterprises (SMEs), should increase its efforts and design additional programs to address this challenge. In the past KOSGEB established 55 Internet cafes with instructors to assist SMEs in using the Internet. But this is not sufficient; much more could be accomplished by, for example, working with universities to provide courses in using the Internet, as well as providing counseling and training services in e-commerce to SMEs.

### 3.3 Other Applications: The Rise of Social Media

The development of social media has been rapid in Turkey. While the country is lagging behind in terms of broadband penetration than more advanced economies, Turkey's youthful population structure makes it a very vibrant market for most social media applications and services. In Turkey, where 70 percent of the population is under 35, online communications is very appealing to young people.

With more than 26 million users, Turkey is one of the 15 largest Internet populations in the world and roughly the size of the Spanish, Italian or Canadian markets. Turkey's mobile penetration is larger than Internet penetration, which means that people increasingly access social network applications from mobile phones.

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<sup>32</sup> Source: Economist Intelligence Unit, news at [http://www.ebusinessforum.com/index.asp?layout=rich\\_story&doc\\_id=11173&title=Turkey%3A+Overview+of+e-commerce&channelid=4&categoryid=31](http://www.ebusinessforum.com/index.asp?layout=rich_story&doc_id=11173&title=Turkey%3A+Overview+of+e-commerce&channelid=4&categoryid=31)

## Top Cities on Facebook

#	City	Country	Total Users
1.	Jakarta	Indonesia	17 484 300
2.	Istanbul	Turkey	9 602 100
3.	Mexico City	Mexico	9 339 320
4.	London	United Kingdom	7 645 680
5.	Bangkok	Thailand	7 419 340

**Table 3-2: Top cities on Facebook** (Source: Socialbakers.com)

Turkey has the fourth highest Facebook population in the world.<sup>33</sup> According to one source, Istanbul has been ranked as the city with the second largest number of Facebook accounts in the world with over 9.6 million people. Following Facebook, the most popular social networking services are Mynet Eksenim, Netlog and MySpace.<sup>34</sup> Twitter and personal blogs have also gained in popularity.

Turkey's own social media content is growing day by day. According to a recent study conducted by a consulting firm, Turkish web sites are getting popular and increasingly diversified. Figure 3- presents a snapshot of the social media landscape in Turkey categorized around different activities (e.g., photo, video, document and music sharing, news services, e-

commerce, business networking, social networking, social bookmarking, blogging and micro blogging, customer tracking, etc.). The figure demonstrates that social media are increasingly popular in society and Turkish content creation is at its emerging stage except for news services where there is a natural tendency to utilize the mother language. In the electronic commerce services segment the leading companies are domestic with uniquely designed and developed web applications.

Istanbul recently hosted the World Social Media Forum providing a meeting place for sharing global experiences and knowledge in this regard.<sup>35</sup> Turkish experience with social media applications presents a useful example for other countries with similar economic and cultural backgrounds.

<sup>33</sup> <http://www.ictdata.org/2011/03/monaco-tops-in-facebook-penetration.html>

<sup>34</sup> comScore, Inc. 2009. "Instant Messaging Accounts for More Than 25 Percent of Total Time Spent Online in Turkey, Followed by Social Networking at 10 Percent", July 16. [http://www.comscore.com/Press\\_Events/Press\\_Releases/2009/7/Turkey\\_Instant\\_Messaging\\_and\\_Social\\_Networking](http://www.comscore.com/Press_Events/Press_Releases/2009/7/Turkey_Instant_Messaging_and_Social_Networking)

<sup>35</sup> <http://www.worldsocialforum.info/news/european-social-forum-turkey-make-them-pay-for-their-crisis>

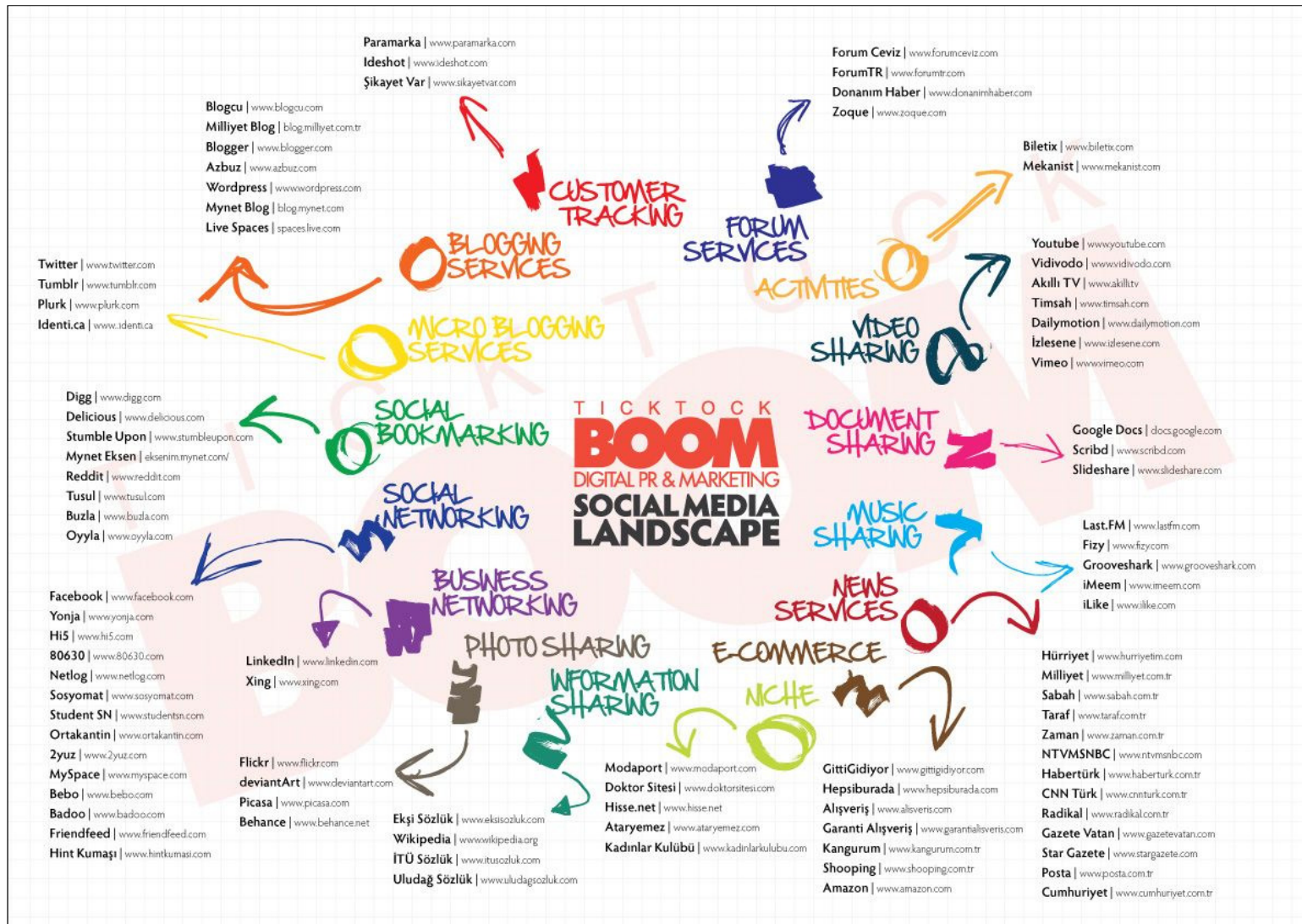


Figure 3-6: The Turkish social media landscape, 2010

(Source: Ticktock Boom at [www.ttboom.com/index.html](http://www.ttboom.com/index.html))

## 4 Usage and Diffusion

Since the Internet can be viewed as a public good necessary for economic and social development, governments should take part in fostering nationwide internet access. A competitive private sector needs to develop the capability to use e-commerce. E-commerce will develop slowly if there are few Internet users, and users will not develop if charges for connections are high, coverage low, and the Internet provides negligible content and services. This section draws analysis on Internet usage and diffusion by people and enterprises. Discussion herein progresses around issues of how individuals and enterprises in Turkey use the Internet and differences in usage as to gender, age, and where people live – the so-called digital divide.

### 4.1 People

Household broadband access is relatively low in Turkey compared to European Union members. In 2010 more than three out of five households living in EU countries had a broadband connection while in Turkey the ratio was 34% (Figure 4-1). This relatively low share of broadband access represents a barrier to the take-up of online government services as well as the development of e-commerce.

Significant differences exist within Turkey:

between urban and rural areas, men and women, young people and individuals aged 55-74, and individuals with higher education and people without higher education. In 2009 urban areas have 32.5% broadband household penetration whereas rural areas have only 11%. However it is observed that the rural broadband connections are growing at a superior rate than that of urban areas which means the digital divide is getting smaller (another factor is because of the restrained growth of broadband infrastructure nationwide and particularly in largely populated urban centers).

The Internet usage proportion is the highest in the 16 – 24 age group (59.4 %) according to the results of the survey applied to the 16 – 74 age groups. The usage of Internet by women (46%) significantly lags behind the usage of men (74.1%) in 16 – 24 age group and all age groups. Consequently, it is important for the government to seek to increase the proportion of individuals using the Internet through better geographical coverage and by reducing the cost of accessing and using the internet.

The level of education and Internet usage are highly correlated. Internet usage of individuals increases in parallel with their education levels. Internet usage by women with college,

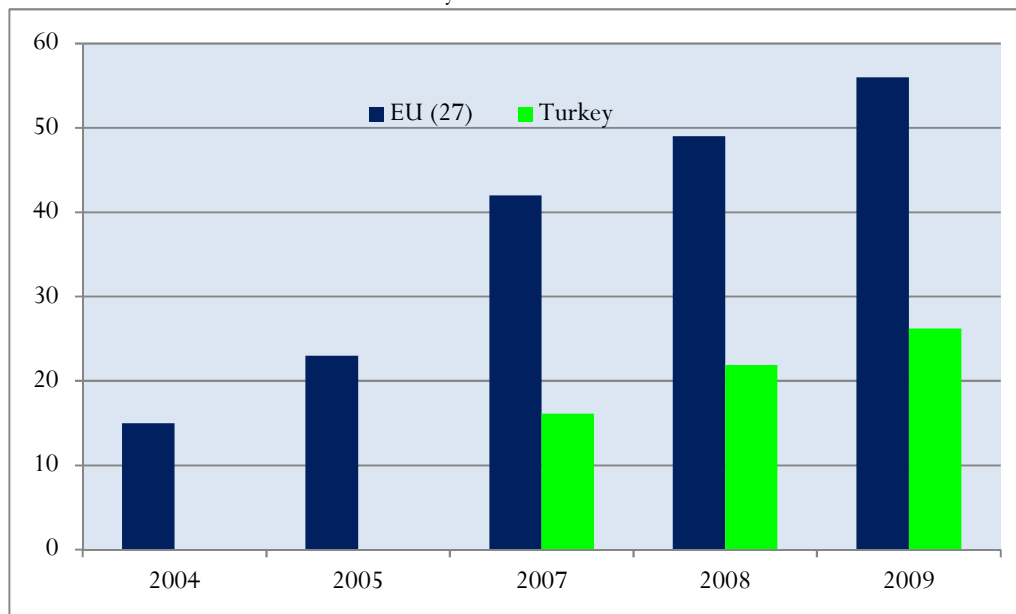
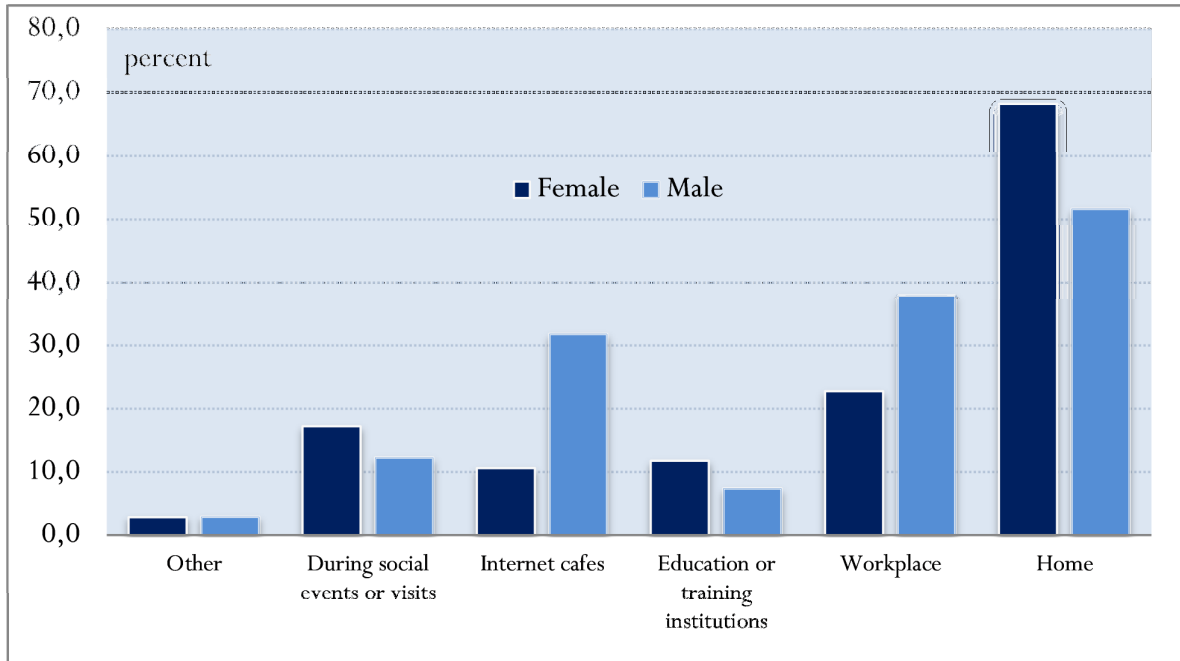


Figure 4-1: Household broadband penetration, as percent (Source: EUROSTAT)



**Figure 4-2: Internet usage by place of connection, male and female, 2009**

university, and higher education (85.8%) is quite close to the usage levels of men with the same educational background (89%). Those using the Internet most, according to employment status, are students (88.2%), employers (66.1%), waged/salaried employees (56.8%), and the unemployed (41.6%).<sup>36</sup>

A great majority of users (68.2 % for females and 51.6 % for males) report using the Internet at home. The proportion of home usage by females is significantly surpassing the usage by males. The workplace usage is among the top forms of Internet connection activities among households and more interestingly Internet cafes continue to offer a wide mean for internet in particular for male groups (31.8%). Individuals also report that they are using internet during social activities and visits. (Figure 4-2).

Though home access have greatly increased recently Turkish people still account for a different structure of access type by place. Internet cafe use is much higher and public libraries are not used at all. This finding shows that Internet access from home or workplace is not always the most revealing measures of actual individual internet access for comparison between countries.

Survey data indicate basic Internet activities such as sending email (73%), reading online news (59%), surfing the web and making social connections (64%) are among the leading forms of Internet usage. Usage rates for more sophisticated Internet activities are still relatively low: Internet banking (17%), looking for a job (10%), online education (6%) and selling goods or services (4%).

Analyses show that Turkey faces a number of challenges in Internet usage. First and foremost improving Internet access and broadband development should be a priority on the supply side. Turkey needs to promote a high degree of broadband coverage using appropriate technologies. Initiatives to reduce the digital divide in Turkey should also include expanding the number of computers and computer classes in primary and secondary schools, and providing increased access to the Internet through community use of school computers. Turkey has demonstrated an ambitious case in trying to close the divide in digital literacy between urban and rural areas by means of education policy. The Ministry of National Education (MNE) and local governments have taken part in this collective effort to foster education in digital skills. The number of students per computer is 30.8 in primary schools and 25.1 in secondary schools nationwide. 27,999 information technology (IT) laboratories were established.

<sup>36</sup> The data come from the Survey results by TURKSAT and figures are for 2009.



	<b>Turkey</b>	<b>Urban</b>	<b>Rural</b>
Sending/receiving e-mails	72.8	73.9	66.9
Posting messages to chat sites, blogs, news groups or online discussion forum, use of instant messaging	64.2	65.0	60.4
Reading or downloading online news/newspapers/news magazines	58.8	58.8	58.9
Finding information about goods or services	55.7	57.7	45.6
Playing or downloading games, images, films or music	51.2	51.1	51.5
Seeking health-related information (e.g. injury, disease, nutrition, etc.)	47.3	48.6	40.8
Telephoning over the Internet/ video calls (via web cam) over the Internet	47.1	48.3	41.0
Listening the web radios or watching web television	41.1	42.1	36.1
Consulting the Internet with the purpose of learning	37.1	38.1	32.1
Uploading self-created content (text, images, photos, videos, music, etc.) to any websites to be shared	30.3	31.3	25.1
Looking for information about education, training or course offers	26.4	27.0	23.5
Using services related to travel and accommodation	22.6	24.9	11.1
Internet banking	16.8	17.8	11.3
Downloading software (other than games software)	14.8	15.6	10.5
Looking for a job or sending a job application	10.2	10.5	8.9
Doing an online course (in any subject)	6.3	6.7	4.5
Selling of goods or services, e.g. via auctions	4.1	4.3	3.1

**Table 4-1: Internet activities of individuals who have accessed the Internet in the last 3 months, by private purposes, %, 2010**

(Source: TURKSTAT, Results of the ICT Usage in Households and by individuals, 2010)

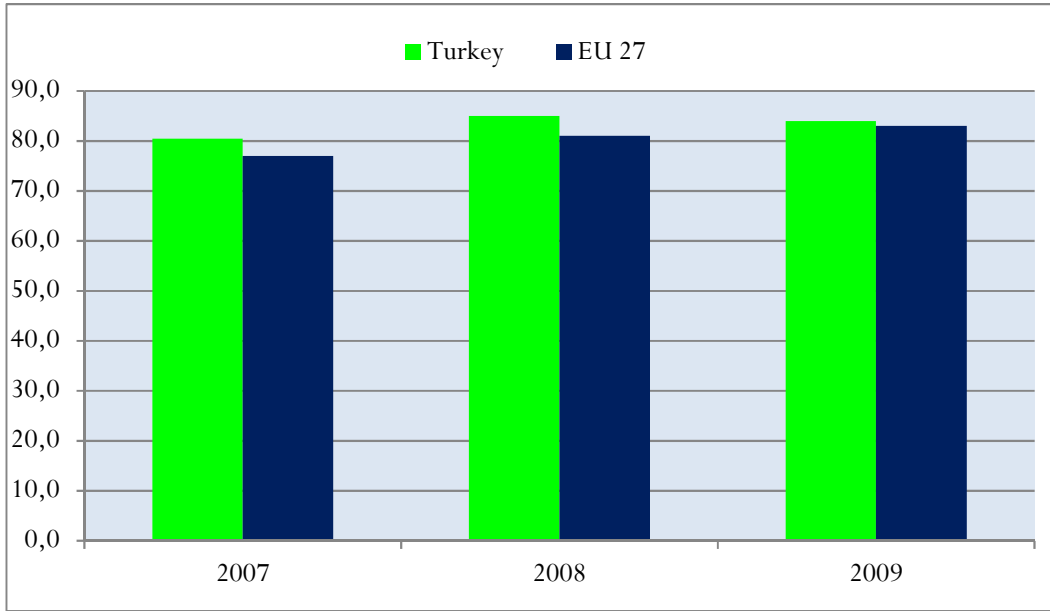
1,850 Public Internet Access Points (PIAP), to provide ICT access and ICT competency to citizens, have been completed by the MNE.

Since the early take up of information society and e-transformation initiatives Turkey has launched a motivated program for teaching computer and information literacy in primary and secondary schools, but more is needed. Turkey should provide means to increase computer and information literacy for people who are not in school. Online distance learning programs and new incentives and programs for Internet cafes to provide a social training base for households living in rural areas may constitute the essence of an effective policy mix. The government should also find means to further motivate citizens to use the Internet by demonstrating and informing citizens about the benefits and advantages of accessing information and government services online.

## 4.2 Business

The business sector has shown somewhat more success in ICT adoption than households. The Turkish business sector has become heavily computerized in the last ten years. Computer usage has become a standard nationwide even in micro sized business units. In 2009 computer penetration rates are as follows: In enterprises with 250 or more employees 99.3%, in enterprises with 50-249 employees 97.7%, in enterprises 10-49 employees 89.5% and in enterprises with 10 or more employees 90.7%.

Similarly Internet access by the business sector has grown explosively and reached a level almost identical to that of computer penetration rates. In January 2010, 90.9% of enterprises with at least 10 persons employed used the Internet. This rate was 98.4% of enterprises with 250 or more employees, while enterprises with 50-249 employees was 96.9% and enterprises with 10-49



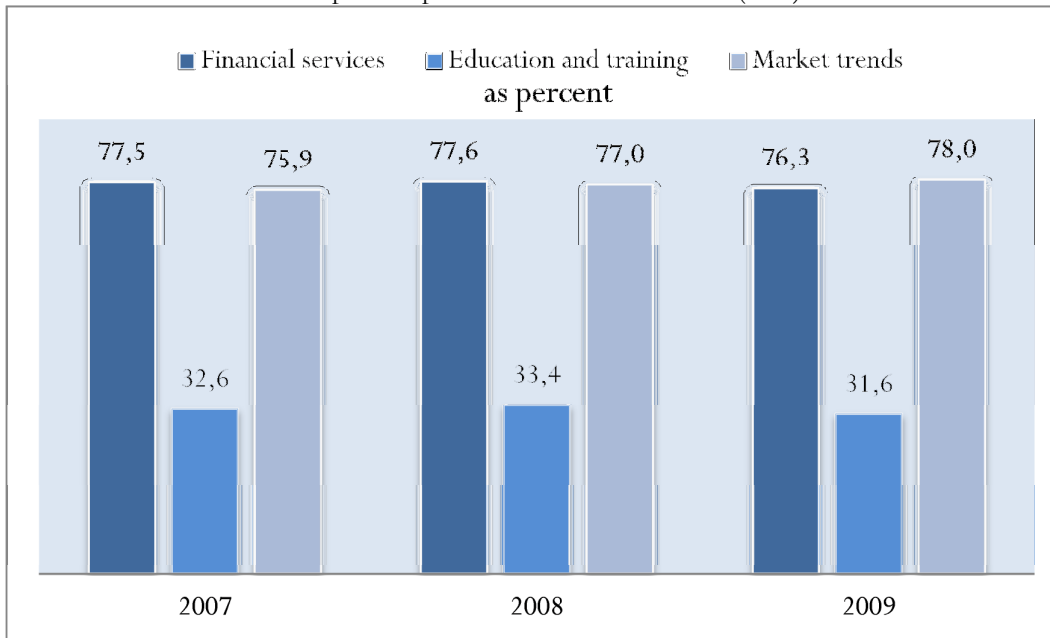
**Figure 4-3. Broadband usage indicators by enterprises, as percent**

employees was 89.7%. 88.8% of enterprises had Internet access in January 2009.

The business sector has demonstrated a major achievement in adopting and utilizing ICTs and broadband. Turkish enterprises have high rate of broadband usage and as compared to EU 27 countries Turkey slightly surpasses the EU averages (Figure 4-3). In terms of connection type the most frequently used access technology in enterprises was DSL with a 94.6% proportion in 2009. However 19.5% of enterprises reported

to have access via traditional dial up connections also. Mobile technologies accounted for 13.5 % and cable technology had a proportion of 10.2%.

Figure 4-4. portrays how firms are integrating internet usage into internal business process. Two points can be drawn from data: The trends are similar between years and a major change is not observed. Secondly, business units are utilizing online connections most for getting financial services (76.3%) and assessing relevant market trends (78%). Diffusion of internet based



**Figure 4-4: Internet usage in enterprises by purpose, 2007-2009**

applications into education and training services accounts for lower but still a significant proportion (31.6%) in 2009.

Lack of sufficient number of candidates with the required qualifications and job experience (39.4%) stood out as the main difficulty faced by enterprises when employing information specialists in 2007. While 68.3% of enterprises reported that the salary expectation of specialists were high, a greater proportion of 74.4% stated that the work experience and competency of specialists as being insufficient. Similarly even a greater proportion of 84.5% reported there was very limited number of candidates with required qualifications in 2007. <sup>37</sup> According to the Survey, enterprises, with a proportion of 8.9 % in 2007, had started to run internal training programs to address the skill gap in ICT technologies.

Though the broadband penetration has been somewhat limited compared to more advanced countries, Turkish businesses have adopted a high level of Internet usage, motivated to a large degree by the desire to use government e-services and penetration into new markets. One exception to this fact is the banking sector where the main motivation is cutting costs rather than demand aggregation.

However, this has not resulted in a fully competent business sector with a high level of broadband usage and applications within integral business processes. A large share of small and medium-sized enterprises (SMEs) selling in local markets with few resources find it difficult to learn and develop new marketing channels. These business units are slow to adapt broadband technologies. Industrial structure is increasingly fragmented and innovative collaboration frameworks and programs are needed. This is where the public policy should engage in effective mechanisms and incentive structures to enable a favorable environment for technological take up.

Given that broadband technologies have a very strong stimulus for economic growth, the government might consider means to stimulate business usage through infrastructure development, as well as providing content and e-services over the Internet through various mechanisms. Requiring firms to interact electronically with e-government services should increase private sector use of the Internet. Additionally, increased broadband availability will allow faster development of Internet usage and serve as an important factor in attracting foreign domestic investment in the Turkish economy. Stronger efforts to foster human resource development and to address the ICT skill gap are needed also.

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<sup>37</sup> Source: SPO (2010), Information Society Statistics, Ankara.

### 5.1 The Likely Impacts of High Bandwidth Networks on the Turkish Economy

According to the National Broadband Vision Study of Turkey,<sup>38</sup> through fostering broadband development the Turkish economy could gain US\$ 4.9-10 billion extra value added each year thereby boosting its economic growth by 0.8-1.7 percentage points. This economic momentum enabled by an enhanced broadband ecosystem would bring 180,000-380,000 new jobs and provide new income opportunities. This implies that employment creation in new broadband-related activities would eventually compensate for job loss due to process optimization and structural displacements.

Through help of a toolkit<sup>39</sup> the Broadband National Vision Study reports to find a significant growth impact for the Turkish economy fueled by broadband enhancing public policies. In the baseline growth scenario Turkish economy would take off by an annual rate of 5.0 per cent as depicted in Figure 5-1, and it would reach the US\$ 1,216 billion GDP level by the end of 2023.

Under the broadband enhancing growth scenario in which a set of active government programs to boost broadband impact are introduced, the economic growth forecast is much faster, with an additional 2.3 percentage points, reaching to 7.3% on annual basis. Government policies targeting enhanced broadband infrastructure and ecosystem will boost economic growth significantly. By 2023 the Turkish economy would have a GDP at

USD 1,652 billion rather than USD 1,216 billion of the baseline scenario. This is a GDP level 36% greater than the baseline. It may accurately be called the *broadband effect*.

The broadband effect encompasses two distinctive categories: Industry benefits (measured as USD 289 billion during 2010-2023) comprising of the overall broadband productivity impacts within and beyond the ICT industry; and pillar effects (measured as USD 147 billion during 2010-2023) which might directly be associated with broadband enhancing policies of the government. Since industry benefits are nearly two times larger than pillar benefits for Turkish economy, broadband enhancing policies should trigger a multiplier effect within the economy and their indirect impacts could potentially outpace the direct effects.

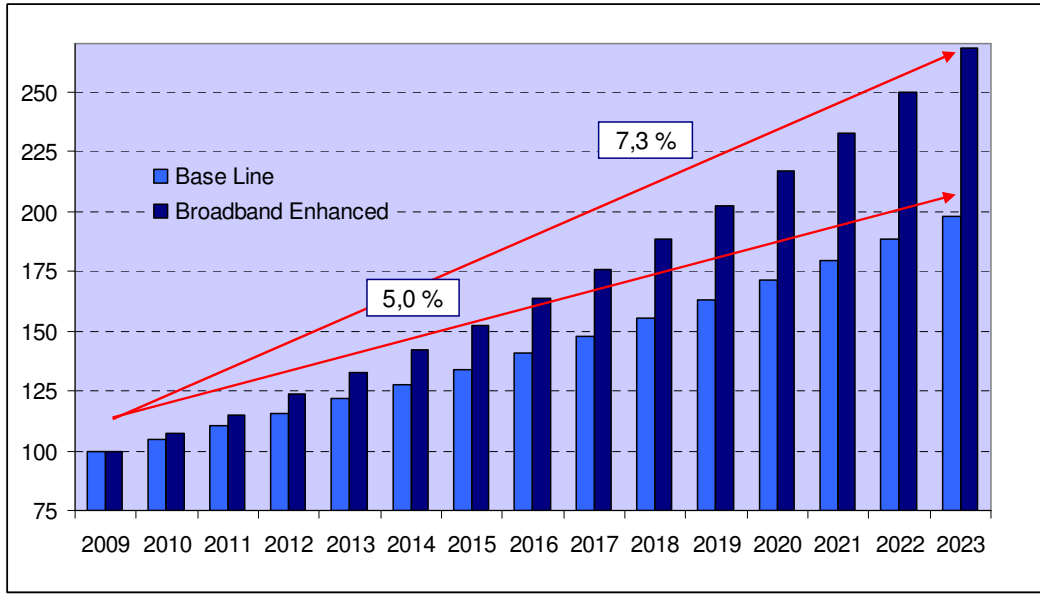
The study also analyzes detailed impacts of enhanced broadband policies on different economic sectors, the so called pillar effects. Pillar effects can be decomposed into different sectors as follows:

- 7 per cent of total pillar effects will come from revitalized small/medium business;
- 6 per cent contribution will arrive from improved government services;
- 4 per cent to come from the benefits of broadband-enabled education;
- 16 per cent to come from a more attractive business environment;
- 67 per cent to come from other sectors, as well as multi-factor productivity and the benefits of collaboration across the economy.

Analyses indicate forecast benefits from increased ICT adoption by the SME sector will be large and e-government applications would provide a significant amount of contribution through cutting costs and improving productivity. Another important policy area that should be focused is education. The main benefit seems to be improvements in the general business

<sup>38</sup> Turkish Prime Minister's Office (2011), From Silk Road to Broadband: Enabling Economic Growth and Competitiveness, Ankara.

<sup>39</sup> Broadband Dynamic Value Assessment (BDVA) is a toolkit that fills a niche between the macroeconomic models that link broadband to aggregate economic growth and models that take a wholly microeconomic approach, measuring specific benefits of broadband by sector or type of usage. The BDVA focuses on broadband implementation objectives of public policy that link broadband penetration rates to "pillars", which in turn, drive GDP growth. The pillars are essentially proxies for broadband implementation objectives. In this manner, the model user can identify which of these pillars have the greatest impact on GDP growth and use this information to formulate a national policy mix for achieving the greatest benefits from wider broadband usage



**Figure 5-1: Base line and broadband enhanced growth scenarios, Real GDP2009=100 (**

environment. Under the broadband enhanced scenario policies to foster the business environment, 16 % of total pillar effects will come from improvements in the business framework alone. The largest one is the multiplier effect. Broadband adoption will bring benefits diffusing beyond the ICT sector through channels of multifactor productivity.

### 5.2 Factors Contributing to Turkey’s Broadband Development

E-government initiatives have been a major driving force for development of the broadband ecosystem. Turkey has implemented a highly motivated e government program that created the necessary demand for enterprises in the ICT sector and motivated citizens for increased Internet usage. In this regard Turkey has demonstrated an interesting example that countries with relatively lower level of Internet penetration and usage ratios can exploit e-government programs as a means to ignite development of the broadband ecosystem.

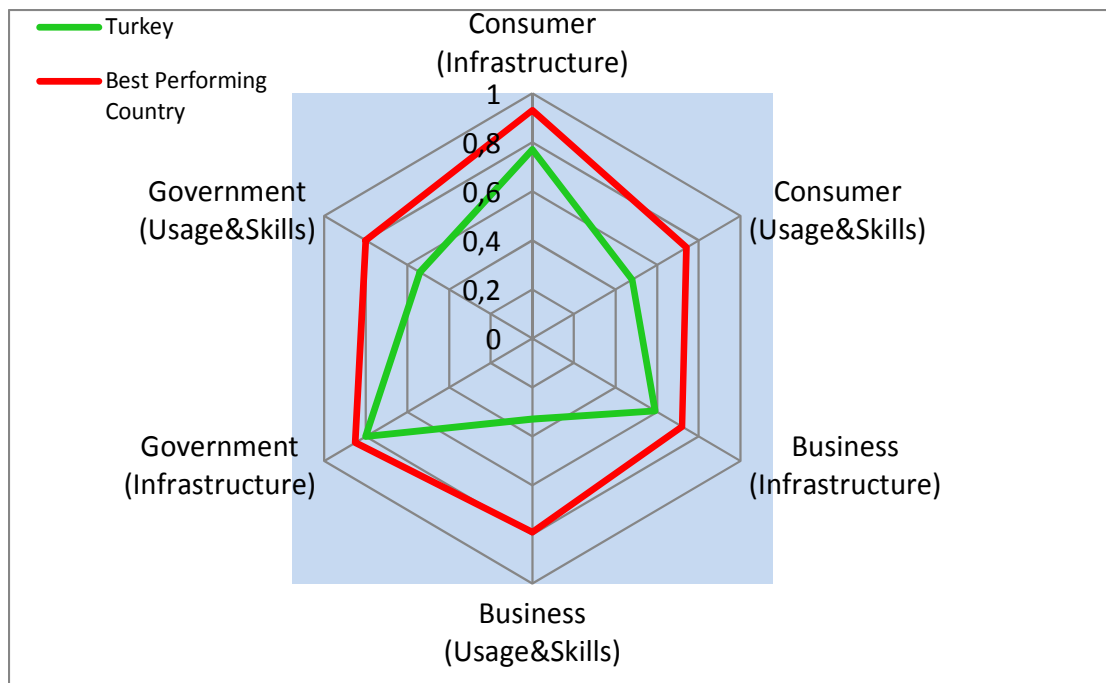
Ensuring a shared vision among political leaders and technocrats has also been an important factor in pushing e-government programs. Since the coming of the new national government into

power in 2002, political leaders saw e-government as a central instrument that would support public reforms and larger changes in the political system. A central organizational structure was formulated to develop strategies and put public money into the pipeline for a set of strategically important projects with high value and a high transaction volume.

The EU candidacy of Turkey and the membership negotiation process has provided a good opportunity for the country to reform its ICT and broadband legal and regulative frameworks. This process helped bureaucrats and top-level managers get closer to European institutions, policies and initiatives, and market developments in these sectors.

The high tempo growth of Turkish economy in the last decade is another factor supporting in the Internet revolution. The new national government has implemented ambitious market oriented reforms complemented with a proactive foreign policy which resulted in large sums of overseas capital flowing into the country. Communications, software and hardware segments of ICT industries have expanded rapidly.

#### 5.2.1 Lessons learned



**Figure 5-2: Turkey connectivity performance by scorecard component, 2010**

(Source: [www.connectivityscorecard.org/countries/turkey](http://www.connectivityscorecard.org/countries/turkey))

The Connectivity Scorecard is a composite index to assess the relative development level of ICTs (Figure 5-2).<sup>40</sup> Turkey was found to have a robust consumer infrastructure due to its high mobile and PSTN penetration and also the recent progress in broadband networks. It also scores strong on consumer usage and skills metrics such as frequent Internet usage and uptake of voice services. According to the Scorecard the country's business infrastructure is above average, with high penetration of secure Internet servers, and substantial business investments in ICT. Turkey also impresses on government-related metrics such as government spending on ICT and provision of government services online.

However the Scorecard points out that Turkey ranks somewhat poorly in business usage and

skills, where its score is considerably lower than one might expect given the state of its business infrastructure. Turkey has made considerable progress in developing a robust ICT infrastructure but its weaker usage and skills scores indicate that the country is yet to fully realize its benefits. Therefore, it needs to place greater effort on ensuring the adoption and diffusion of ICTs to leverage competitive power.

Turkey faces a strategic opportunity in terms of broadband infrastructure development. The majority of the national broadband network is based on slower speed connections which do not optimally support advanced applications of next generation connectivity such as e-education, e-health, etc. There are signals suggesting the current broadband network has become somewhat overloaded.

To enhance a rapid take up of high bandwidth broadband networks the government should play a more effective and active role. First and foremost is ensuring effective regulation. The public stake in the incumbent operator should not prevent authorities from enforcing rules for fostering competition in the broadband market. Secondly, Turkey should design a complete and integrated broadband strategy for coordinating various individual pieces in the same direction.

To enable increased ICT and broadband adoption by businesses the government should exercise greater efforts to design effective

<sup>40</sup> The Connectivity Scorecard is the first index to examine the quality and quantity of ICT usage and infrastructure and to link it to a country's social and economic prosperity. 25 'Resource and Efficiency Driven' and 25 'Innovation Driven' economies are studied (as defined by the World Economic Forum (WEF)) in this first phase. The first step taken is to divide the economy into 3 'pillars', business, consumer and government and assign weights to these pillars. The greatest weighting is given to the business pillar since it is a key contributor to productivity growth. For each component of the scorecard countries are benchmarked against the best-in-class in their tier. Low scores reflect gaps in a country's infrastructure, usage or both. For more information see "Connectivity Scorecard" at: <http://www.connectivityscorecard.org/methodology/>

programs and incentives. In particular skill gaps should be identified and adequately addressed with participation of private initiatives.

The lack of a suitable national accounting framework for more detailed analysis hinders international benchmarking in most emerging

policy areas notably ICTs and innovation. Turkey should take measures to address this problem and ensure reliable and timely indicators are developed and made available to the public.

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## 5.1 Online Resources

[www.carelink.se/en/mission/sjunet](http://www.carelink.se/en/mission/sjunet)

<http://www.dtc.umn.edu/mints/home.php>

<http://econ.worldbank.org/>

[www.oecd.org](http://www.oecd.org)

The Central Bank of the Republic of Turkey at [www.tcmb.gov.tr](http://www.tcmb.gov.tr)

The Undersecretariat of the Treasury at [www.treasury.gov.tr](http://www.treasury.gov.tr)

Invest in Turkey at <http://www.invest.gov.tr>

<http://www.invest.gov.tr/en-US/sectors/Pages/ICT.aspx>

Export Promotion Center (IGEME) at [www.igeme.org.tr](http://www.igeme.org.tr)

<http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=8450>.

<http://www.turksat.com.tr/english/v2/cable-services>

<http://www.eutelsat.com/products/broadcast-audience.html>

Economist Intelligence Unit, news at

[http://www.ebusinessforum.com/index.asp?layout=rich\\_story&doc\\_id=11173&title=Turkey%3A+Over+view+of+e-commerce&channelid=4&categoryid=31](http://www.ebusinessforum.com/index.asp?layout=rich_story&doc_id=11173&title=Turkey%3A+Over+view+of+e-commerce&channelid=4&categoryid=31)

Ticktock Boom at <http://www.ttboom.com/index.html>

<http://www.connectivityscorecard.org/methodology/>

<http://www.socialmedia-forum.com/>

## About *infoDev*

*infoDev* is a global development financing program among international development agencies, coordinated and served by an expert Secretariat housed at the World Bank Group, one of its key donors and founders. It acts as a neutral convener of dialogue—and as a coordinator of joint action among bilateral and multilateral donors—supporting global sharing of information on ICT for development (ICT4D), and helping to reduce duplication of efforts and investments. *infoDev* also forms partnerships with public and private sector organizations who are innovators in the field of ICT4D. *infoDev* is housed in the Financial and Private Sector Development (FPD) Vice Presidency of the World Bank Group.

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