FACTORS AND IMPACTS IN THE INFORMATION SOCIETY
A PROSPECTIVE ANALYSIS IN THE CANDIDATE COUNTRIES

REPORT ON TURKEY

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PREFACE

The Institute for Prospective Technological Studies (IPTS) of the Directorate General Joint Research Centre of the European Commission contracted the International Centre for Economic Growth, European Centre (ICEG EC) to act as the coordinator of a consortium of 11 research institutes to carry out this project.

The main objective of the project was to provide a series of national monographs studying the development of the Information Society (IS), including positive and negative impacts, in each of the candidate countries. These monographs offer an assessment of the strengths and weaknesses of each country regarding the development of IS (strongly rooted in factual quantitative data), and a view on their possible outcomes. They provide a clear, contextualised, multi-factoral and multi-causal picture of the input factors that contribute to the success or failure of IS developments, and the relevant output parameters that support mid- and long-term impacts on economic growth, employment and other relevant aspects of the future of each country. Each monograph concludes with a set of alternative scenarios for the development of IS in that country.

This report was carried out by Bilkent University and Ankara Cyberpark, and aims to study the factors and impacts of the Information Society in Turkey. The report reflects the research results, comments and opinions of the team of authors. It does not necessarily reflect the opinion of the European Commission. It is organised around 9 themes – economy, demography, government policies, industrial development and competitiveness, relevant economic activity, IST penetration rates, institutional capacity and regulatory background, education, and culture. The section on each of these themes concludes with a specific SWOT analysis. Finally, a general diagnosis is made of Turkey's potential for IS developments, followed by a brief section on possible scenarios for the future and policy recommendations.

A Synthesis Report was also prepared by the Project Coordinator, the International Centre for Economic Growth, European Centre (ICEG EC), on the basis of all the country studies. This offers an integrated and prospective view on the future outlook for the Information Society in the Candidate Countries and can be found on the FISTE (Foresight in Information Society Technologies in Europe) website: http://fiste.jrc.es/

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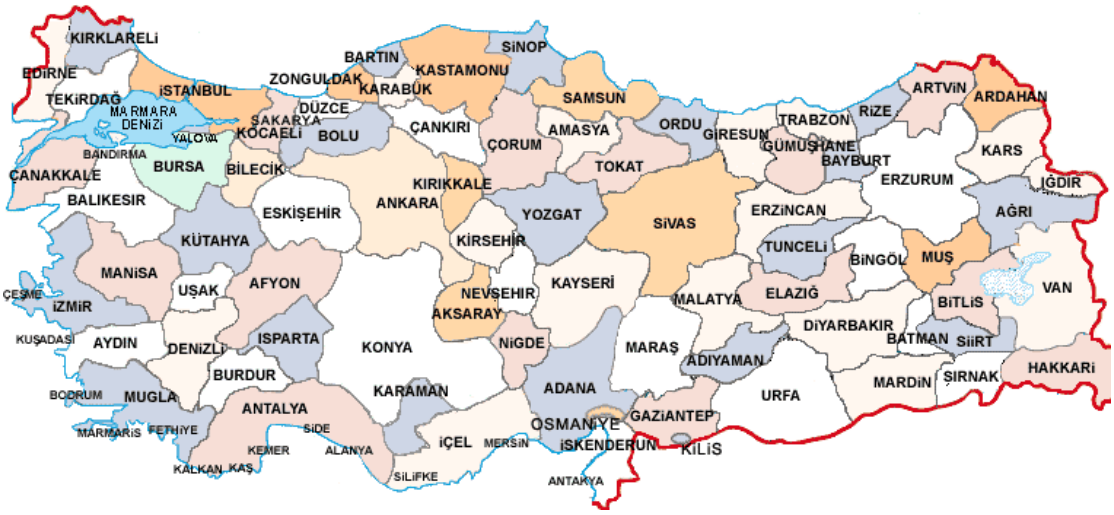
COUNTRY PROFILE

Turkey is administratively divided into 81 provinces (see Map 1. below), each made up of several counties, towns and villages. The administrative head of each province is a governor who essentially acts as the representative of the central government at the provincial level, rather than a powerful and politically independent figure. The governor is the chief administrative officer leading the *kaymakams*, the petty administrative officers who head and supervise the activities of the local branches of ministries and other central government agencies in counties/towns. Each county/town within the provinces has its local government headed by an elected mayor who essentially runs the local government organized through municipalities. Cities within provinces are larger towns that typically play the role of provincial capital,[1] or metropolitan areas (such as Adana, Ankara, Bursa, Istanbul or Izmir) made up of several towns themselves. In metropolitan areas, there is an elected mayor running the local government at the metropolitan level in coordination with mayors heading the municipalities in individual towns that make up the metropolitan area.



Map 1. Provincial map of Turkey

A common practice in Turkey is to classify these provinces into seven geographical regions to facilitate generalizations about provinces: Aegean Region, Central Anatolia Region, Eastern Anatolia Region, Marmara Region, Mediterranean Region and South-Eastern Anatolia Region. While this regional classification does not correspond to any administrative division, it is a convention proven to be convenient to employ in many contexts. The conventional classification is based on the following aggregation of provinces into regions, with the borders of each region defined as in Map 2.

[1] Cities that play the role of provincial capital are where the governors' offices are. Since the provinces are typically named after these cities, the capital city and province have the same name. The only exceptions to this rule are the provinces of Icel (whose capital city is called Mersin) and Sakarya (whose capital city is called Adapazari).

Regional classification of provinces in Turkey

Aegean	Black Sea	Central Anatolia	Eastern Anatolia	Marmara	Mediterranean	Southeastern Anatolia
Afyon	Amasya	Aksaray	Ardahan	Balikesir	Adana	Adiyaman
Aydin	Artvin	Ankara	Agri	Bilecik	Antalya	Batman
Denizli	Bartin	Çankiri	Bingöl	Bursa	Burdur	Diyarbakir
Izmir	Bayburt	Eskisehir	Bitlis	Çanakkale	Hatay	Gaziantep
Kütahya	Bolu	Karaman	Elazig	Edirne	Isparta	Kilis
Manisa	Çorum	Kayseri	Erzincan	Istanbul	Içel	Mardin
Mugla	Düzce	Kirikkale	Erzurum	Kirklareli	Kahramanmaras	Siirt
Usak	Giresun	Kirsehir	Hakkari	Kocaeli	Osmaniye	Sanliurfa
	Gümüshane	Konya	Igdir	Sakarya		Sirnak
	Karabük	Nevsehir	Kars	Tekirdag		
	Kastamonu	Nigde	Malatya	Yalova		
	Ordu	Sivas	Mus			
	Rize	Yozgat	Tunceli			
	Samsun		Van			
	Sinop					
	Tokat					
	Trabzon					
	Zonguldak					

Map 2. Geographical regions in Turkey by the commonly used (climatic) division

TURKEY-DATA PROFILE:

General Data	
Population (million, 2003)	69.6
Area (sq. Km, 2003)	774800
GDP (billion EUR, 2002)	194.3
GDP/capita (EUR, PPP, 2002)	7300
GDP growth (2002)	7.8
GDP distribution (2001)	
Agriculture (%)	12.9
Industry and Construction (%)	30.4
Services (%)	56.7
Merchandise Trade (2001)	
Exports (billion EUR)	39.4
Imports (billion EUR)	47.2
Reserves including gold (billion EUR)	35.2
Currency Units (2002 end of the year, Turkish lira)	EUR 1.00 = 1733874
Penetration of IT	
Telephone/100 (1999)	30
Mobil Cell Phone/100 (2001)	25.8
PCs/100 (2000)	3.8
Internet users/100 (2002)	3.7

Source: CIA World Fact book 2003, WDI 2002

A. NATIONAL AND REGIONAL ECONOMY

A.1. Economic growth

For most of the Republican Era prior to 1980, Turkey had followed an import substitution-based development strategy. This strategy was first adopted in response to the Great Depression of 1929 in an attempt to keep the economy self-sufficient during the world crisis, at least in terms of agricultural processing and basic manufacturing products such as textiles. This target was largely achieved by the State Economic Enterprises (SEEs) which were forced to assume the leadership in achieving the domestic production targets of basic needs, on account of the lack of private capital accumulation in the country. The strategy was, however, maintained after the Depression and the Second World War, with the aim revised in the early 1960s to domestically produce relatively more complicated manufacturing goods such as durable consumption goods/appliances and certain intermediate goods, as well as assembly manufacturing of cars. As the private sector had accumulated more capital by then, the public sector redefined its role as a provider of infrastructure, and a supplier of certain key inputs such as iron and steel products, and energy for manufacturing activities carried out by the private sector. The five-year development plans were prepared to set the medium-term development targets, and to bring resource allocation decisions of private agents in line with these targets through various investment incentives and input subsidies.

Under the leadership of the government that directed private producers toward its own production and investment targets, Turkey had become capable of domestically producing all low- or mid-tech manufacturing goods under foreign licenses by the end of the 1970s (Guruz and Pak, 2003). Yet, the controlled economy run under a fixed foreign exchange rate regime suffered from persistent current account deficits, and failed to generate foreign exchange receipts that were large enough to finance imports. The resulting shortages of foreign exchange have sometimes been so severe as to require restrictions on imports and even trips abroad, and have led to the emergence of a black market for foreign exchange transactions. Endowed with the right to issue permits for fulfilment of import quotas, and the control of investment and production subsidies to be distributed, the public sector also became a distributor of rents in the process, and the need for a major structural transformation became evident.

The reforms were started with the opening of a major structural adjustment package in 1980 when primary agriculture in Turkey contributed 25% of the real GDP; employed 60% of the civilian workforce and accounted for 57% of total exports. Steps taken to increase market-orientation of the economy began with a major devaluation of the Lira and were followed by the introduction of a set of measures to liberalize foreign trade and domestic commodity and financial markets. With the adoption of additional measures to raise the share of the private sector in economic activities, the program represented a break-away for the Turkish economy from an import substitution-based development strategy to an export-oriented strategy. Legal arrangements were made to facilitate improved market access for private agents and to allow for the privatisation of state-owned enterprises (Sayan and Demir, 2003). The reforms facilitated a faster decline in the relative significance of agriculture in the economy, with this sector's respective real GDP, employment and exports shares coming down to 17%, 47% and

17% in 1990, and continuing to fall further to reach 13%, 35% and 7% in 2000. During the same period, the corresponding shares of industry and services continuously increased.[2]

Although the policies started in the 1980s, the further promotion of the transition to a more competitive market economy was largely maintained in the 1990s, persistently high rates of inflation and macroeconomic imbalances emerging in the second half of the 1980s remained a major problem throughout this decade. As a result of these macroeconomic imbalances (particularly the growth of budget deficits), the economy went into severe recessions twice during that decade (in 1994 and 1999), suffering major set-backs in the growth performance (Tables A.1.1., A.1.2. and A.2.). The contraction in 1999 was further deepened by the terrible earthquake that hit the areas with the highest concentration of manufacturing industry. Just as the economy was recovering, there came two major economic/financial crises in November 2000 and February 2001, abruptly stopping the economic recovery.

As can be seen from the data in Table A.1.1, real Gross Domestic Product measured in 1987 prices took sharp dives in 1994, 1999 and 2001, even though the per capita value of GDP in purchasing power parity (PPP) terms remained less volatile, and kept growing more or less steadily from ECU 3 683 in 1990 to EUR 6 796 in 2001. Table A.1.2. shows the relative position of Turkey among the candidate countries by the euro values of per capita GDP in purchasing power parity terms as reported by the World Bank. A ranking of PPP equivalents of per capita GDP in 2000 by these figures places Turkey higher than Romania and Bulgaria.[3] By the OECD figures (at http://www.oecd.org/dataoecd/48/5/2371372.pdf), Turkey's PPP GDP per capita value of EUR 5 300 in 2001 corresponds to 22% of the EU average of EUR 25 600 in the same year.

[2] In most rural areas where the major economic activity is agriculture, population density is low and concentrated in small villages that are far apart from each other, and from larger town centers. While it is possible for most of the people living in these villages to access internet through dial-up connections, the combined cost of equipment and connection is normally much higher than the typical individual residing in a rural area could afford or would be willing to pay. Given that rural folks are typically less educated than urban residents, and that the benefits of internet access would necessarily be limited in rural areas, individual subscriptions to internet services are very rare. While internet cafes offer a viable and usually affordable alternative to individual subscriptions, especially for the younger generation, they will not be available in the overwhelming majority of rural communities, as running an internet cafe in a small village would not be a profitable business. So, the high share of population that makes their living out of agriculture in rural communities is likely to slow down the development of ICT in Turkey to some extent. Still, a trend towards increasing popularity of internet is emerging in some villages in the Aegean, Marmara and Mediterranean regions where the land is fertile and towns are richer due to higher income from agricultural activities, or the revenue from tourism or manufacturing jobs, and will eventually catch on with the other areas.

Table A.1.1. Income indicators

Year	Nominal GDP (bn. ECU/EUR)*	PPP GDP/ Capita (ECU/EUR)*	Growth of Real GDP --at 1987 prices-- (%)
1990	117.9	3 683	9.3
1991	122.1	3 866	0.9
1992	122.6	3 966	6.0
1993	154.0	4 810	8.0
1994	108.7	4 518	-5.5
1995	131.2	4 442	7.2
1996	144.9	4 887	7.0
1997	169.0	5 716	7.5
1998	178.4	5 569	3.1
1999	173.7	5 575	-4.7
2000	217.1	6 885	7.4
2001	165.9	6 796	-7.4

Source: State Planning Organisation (SPO), OECD.
* Conversions into ECU/EUR are based on yearly averages of exchange rates reported by the Turkish Central Bank (TCMB)

Table A.1.2. GDP per capita at PPP (ECU/EUR)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
BG	4727	4719	4000	4486	4611	4527	4321	4568	4726	5189	6681
CZ	..	..	7830	8901	9131	9142	10095	11205	11138	12131	15022
EE	6451	6286	5056	5342	5382	5292	5811	7466	7757	8398	11030
HU	7292	6758	6454	7234	7512	7227	7587	8912	9461	10597	13245
LV	6866	6499	4234	4128	4230	3984	4309	5311	5658	6426	8172
LT	7175	7118	5555	5257	4791	4831	5355	6525	7067	7527	9357
MT	6912	7769	8082	9521	10178	10119	10985	12784	13472	14537	19319
PL	4778	4571	4546	5284	5594	5583	6102	7297	7636	8554	10663
RO	4251	3919	3617	4150	4324	4372	4757	5018	4792	5114	6132
SK	7179	6486	5963	6453	6808	6735	7416	8795	9137	10038	12289

Source: The World Bank (http://devdata.worldbank.org/hnpstats/), own calculations

Table A.2. Composition of GDP growth

Year	Growth Rate of Output* by Sector (%)			Demand Components of Growth in Real GDP* (%)				
	Agr.	Ind.	Ser.	C	I	G	X	M
1990	6.8	8.6	10.3	13.1	15.9	8.0	2.6	33.0
1991	-0.9	2.7	0.6	2.7	0.4	3.7	3.7	-5.2
1992	4.3	5.9	6.5	3.2	6.4	3.6	11.0	10.9
1993	-1.3	8.2	10.7	8.6	26.4	8.6	7.7	35.8
1994	-0.7	-5.7	-6.6	-5.4	-16.0	-5.5	15.2	-21.9
1995	2.0	12.1	6.3	4.8	9.1	6.8	8.0	29.6
1996	4.4	7.1	7.6	8.5	14.1	8.6	22.0	20.5
1997	-2.3	10.4	8.6	8.4	14.8	4.1	19.1	22.4
1998	8.4	2.0	2.4	0.6	-3.9	7.8	12.0	2.3
1999	-5.0	-5.0	-4.5	-2.6	-15.7	6.5	-7.0	-3.7
2000	3.9	6.0	8.9	6.2	16.9	7.1	19.2	25.4
2001	-6.1	-7.5	-7.6	-9.0	-31.7	-8.6	7.4	-24.8

Source: SPO

* At 1987 prices.

By the end of the 1990s, the growing budget deficit had indeed begun to threaten the sustainability of debt servicing by leading to outrageously high real interest rates. A comprehensive macroeconomic stabilisation package was set at the end of 1999 under the supervision and support of the IMF through a three-year Stand-by Arrangement.

The programme targeted:

- -to bring the inflation rates down to single digits by the end of 2002,
- -to reduce the interest rates and put public finance on a sustainable path,
- -to put the economy on a higher and a more stable growth path,
- -to implement the structural reforms needed to create a more productive, competitive, and flexible economic structure, by using the following tools:
  - tight fiscal policy to considerably increase the primary surplus of the total public sector,
  - a forward looking income policy,
  - a credible monetary policy in combating inflation,
  - structural reforms in the areas of agricultural support system, social security, privatisation, fiscal transparency and regulation and supervision of the financial sector.

To break the inflationary expectations in an attempt to decrease real interest rates, the exchange rate was chosen as a nominal anchor, and daily values of an exchange rate basket consisting of USD 1 + EUR 0.77 that are consistent with the inflation target were announced.

Initially gaining a high credibility, the programme led to a sharp reduction in interest rates from 90 percent in December 1999 to 35 percent in January 2000, which then fluctuated within the 35-40 percent band until August 2000. The falling interest rates together with the exchange rate policy stimulated domestic demand which was suppressed due to high real interest rates in 1999, and tax hikes introduced to finance the recovery expenses incurred after the earthquake of August 1999.

The IMF-controlled stabilization programme, however, failed to fix the problems in the balances of banks on time and the November 2000 crisis broke out. In the aftermath of the November 2000 crisis, higher interest rates and the uncertain economic outlook led to a downward trend in domestic demand and production, which accelerated the shift following the second crisis at the end of February 2001 to a new economic stabilization package called "the Programme for Strengthening the Turkish Economy". The programme was put into effect under a substantially revised set of conditions set by the IMF including the adoption of the floating exchange rate regime. The main goals of the programme were reducing uncertainties in the financial markets by taking the necessary measures in the banking sector urgently so as to facilitate stabilization of interest rates and exchange rates; completing structural reforms to improve economic efficiency, and pursuing macroeconomic policies to lower the inflation rate and to place the economy on a sustainable growth path. Within this context, fiscal policy was tightened further in order to stabilize the increasing debt stock of the public sector, and the control of the Central Bank over short-term interest rates was increased. So far, the programme has been successful in reducing the rate of inflation to levels that have not been observed in the past two decades, interest rate reductions followed and the economic growth started to pick up. It appears that the Turkish economy has once again returned to the path of economic growth, and thanks to the reforms introduced in response to the recent economic crises, continuous and persistent macroeconomic instability will no longer be a problem.

A.2. Changes in employment

A.2.1. Changes in labour supply

Although Turkey has a relatively large labour market due to its high population and its age composition, participation rates are low compared to other countries. By the figures regularly put out by the State Institute of Statistics based on labour market surveys, the total participation rate is 49.2 percent, of which 73.1 percent are men and 25.5 percent are women as of 2000. One of the main reasons for the low aggregate participation rate of women in the general labour market is the fact that their participation in the urban labour market remains rather low due to a host of cultural and historical reasons. As a result, despite a high participation rate in rural, agricultural labour markets, overall participation rate for women remains low.

Unemployment is also a problem as indicated by the figures in Table A.3. Unemployment does not only affect higher age groups but also the young, particularly the educated youth. In 2000, the urban and rural unemployment rates were 8.9 and 3.7 percent on the average, with the unemployment rate of the educated youth in urban areas reaching such a high rate as 22.4 percent. The relatively low unemployment rate in the rural areas is due to a rather large stock of unpaid family workers and self-employed persons. While the younger among these unpaid and unskilled family workers often choose to migrate from rural to urban areas in search of higher life standards, creating a continuous flow of rural-urban migration, they have little chance to participate in the urban labour markets due to the lack of job skills. This forces them to turn to marginal jobs or illegally work without social security coverage.

Table A.3. Developments in labour markets as indicated by labour market surveys

Year	Labour Force (thousands)	Participation Rates (%)	Unemployment Rates (%)		
			Overall	Males	Females
1990	20 847.3	56.6	8.0	7.8	8.5
1991	21 438.0	57.1	8.1	8.5	7.0
1992	21 503.0	56.1	8.3	8.6	7.6
1993	21 469.0	52.2	8.8	8.6	9.1
1994	22 158.0	54.6	8.4	8.6	8.0
1995	22 673.0	54.1	7.5	7.6	7.3
1996	22 919.0	53.5	6.5	6.8	5.9
1997	21 824.5	52.2	6.7	6.3	7.8
1998	22 399.0	52.3	6.8	6.8	6.9
1999	23 187.0	53.0	7.7	7.7	7.5
2000	22 031.0	49.2	6.6	6.6	6.5
2001	22 269.0	48.7	8.5	8.8	7.9
2002	n/a	n/a	10.6	n/a	n/a

Source: State Institute of Statistics (SIS)

In regional terms, the unemployment rates as of 2000 were as follows.

Table A.4. Regional rates of unemployment by labour market surveys, 2000

Region	Unemployment Rate (%)
Aegean	8.0
Black Sea	3.9
Central Anatolia	4.2
Eastern Anatolia	3.0
Marmara	8.0
Mediterranean	8.9
South-eastern Anatolia	7.0

Source: SIS.

The relatively lower rates of unemployment in Black Sea and Eastern Anatolia regions follow from the high shares of people who have either turned to informal sector or chosen to stay in agriculture as unpaid family workers, rather than the higher level of activity in these regions.[2]

The data from the State Institute of Statistics indicated only a limited increase in employment between 1995 and 1999. In this period, the annual average growth rate of employment stood at 1.8 percent, while the labour force grew by 1.5 percent on the average (SPO, 2001).

[2] Labour market surveys do not count respondents reporting that they are not in search of a job among the unemployed.

A.2.2. Changes in labour productivity

Changes in real labour productivity in Turkey since 1990 have generally followed an upward trend between 1990 and 2000, fluctuating in a marked way around crisis years of 1994, 1999 and 2001 (Table A.5.).

Table A.5. Changes in labour productivity in Turkey

Year	**Nominal GDP/ Labour Force** (in ECU/EUR)	**Real GDP/Labour Force** (in millions of TL at 1987 prices)	**Growth Rate with respect to Previous Year** (%)
1990	5 654	10 447	
1991	5 696	10 414	-0.32
1992	5 701	10 771	3.43
1993	7 175	10 976	1.90
1994	4 904	10 872	-0.95
1995	5 786	13 052	20.05
1996	6 320	16 115	23.47
1997	7 744	16 811	4.32
1998	7 963	17 076	1.58
1999	7 491	14 370	-15.85
2000	9 853	17 998	25.25
2001	7 448	12 943	-28.09

Source: Calculated from GDP and labour force data reported elsewhere.

A.3. Changes in cross border capital flows

A.3.1. Patterns of supply of FDI, role of FDI (ICT-related)

The changing orientation of Turkish economy and increasing degree of openness after the structural reforms of 1980 led to a boom in exports which were mostly concentrated in agricultural and livestock products prior to 1980. The value of exports increased from $2.26 billion in 1979 to $12.96 billion in 1990 and to $31.34 billion in 2001 (Table A.6.). With such industries as textiles and garments, iron and steel, and food-processing ranking among the leading contributors to this boom, the composition of exports began to change in favour of manufactured goods. Starting from the 1990s, the improvement in the scientific and technological capacity of the country was reflected by the significant increases in exports of the so-called “Technology Intensive Products” (see Sections C.3. and C.6.) (Kotan and Sayan, 2002 and 2004).

The increasing share of exports in GNP (Table A.6.), coupled with the increasing share of manufactured products in overall exports indicate the increasing strength of the Turkish economy in becoming a major regional base for industry and manufacturing activities.

Table A.6. Indicators of openness for Turkish economy

Year	Value of Exports (Million ECU/EUR)	Index of Value of Exports	Exports/ GNP (%)	Per Capita Exports (ECU/EUR)	Value of Imports (Million ECU/EUR)	Index of Value of Imports	Imports/ GNP (%)	Per Capita Imports (ECU/EUR)
1980	2090	100	4.2	47	5681	100	11.3	128
1985	10429	499	11.7	207	14865	262	16.6	295
1990	10178	487	8.5	181	17516	308	14.6	312
1991	10970	525	8.9	191	16984	299	13.8	297
1992	11336	542	9.2	194	17619	310	14.2	302
1993	13104	627	8.4	220	25131	442	16.2	424
1994	15224	728	13.8	252	19563	344	17.7	324
1995	16541	791	12.6	268	27300	481	20.8	443
1996	18291	875	12.6	292	34359	605	23.6	548
1997	23240	1112	13.5	265	42973	756	25.0	673
1998	24031	1150	13.1	370	40913	720	22.3	630
1999	24958	1194	14.2	377	38178	672	21.7	577
2000	30086	1440	13.8	446	59037	1039	27.1	875
2001	35009	1675	21.3	511	45141	795	27.5	658

Source: State Planning Organization (SPO) and State Institute of Statistics (SIS)

In 2000, total exports increased by 19% percent in real terms and reached 30 billion euros. Yet, real imports increased even more due to the real appreciation of Turkish Lira (TL), the rise in domestic demand, and the increase in the prices of imported crude oil and natural gas. Thus, trade deficit in 2000 reached 29 billion euros, representing an increase of 15.8 billion euros over its 1999 value.

Table A.7. shows external and internal balances of Turkish economy, including the situation concerning foreign direct investment.

Table A.7. Macroeconomic balances and indicators

	1981	1991	2000	2001
DOMESTIC PRICES (% change)				
Consumer prices		65.9	54.2	60.7
Implicit GDP deflator	44.1	58.9	49.9	57.2
GOVERNMENT FINANCE (% GDP includes current grants)				
Current revenue		21.0	29.0	31.5
Current budget balance		1.7	-11.0	-14.1
Overall surplus/deficit		-10.2	-18.9	-20.9
TRADE (ECU/EUR million)				
Total exports (fob)	4212	11029	34301	39386
Textiles	798	3808	10885	11555
Processed agricultural products	1452	2077	1827	2096
Manufactured products	3181	9814	27448	32054
Total imports (cif)	8001	16984	58988	47240
Fuel and energy	3680	3187	10322	9315
Capital goods	1722	5780	12486	8474
Export price index (1995=100)		94	78	78
Import price index (1995=100)		92	81	77
Terms of trade (1995 = 100)		101	96	101
BALANCE AND PAYMENTS (ECU/EUR millions)				
Exports of goods and services	5 391	17209	54288	55580
Imports of goods and services	8 124	19549	67367	51215
Resource balance	-2 733	-2339	-13078	4364
Net income	-1 292	-1574	-3217	-4819
Net current transfers	2 291	4115	5660	4248
Current account balance	-1 733	202	-10636	3794
Financing items (net)	1 729	-1032	7390	-18231
Changes in net reserves	4	830	3246	14437
Memo:				
Reserves including gold (ECU/EUR mill.)	1 546	9888	37680	35173
EXTERNAL DEBT AND RESOURCE FLOWS (US$ million)				
Total debt outstanding and disbursed	17230	41053	128125	128778
Total debt service	2149	6688	22461	26027
Composition of net resource flows				
Official grants	93	1520	32	0
Official creditors	1023	-595	1055	1448
Private creditors	-9	4926	10094	-2548
Foreign direct investment	85	632	121	3093
Portfolio equity	0	-2406	-5424	-4631
World Bank Program				
Commitments	502	726	1936	2458
Disbursements	407	366	1398	1717
Principal repayments	57	543	533	489
Net flows	349	-177	867	1229
Interest payments	91	409	258	326
Net transfers	258	-587	609	903

Source: World Bank (2002).

Although there was an improvement in the non-merchandise trade balance, due particularly to the sharp increase in tourism receipts, the current account deficit increased by 8.9 billion euros in 2000 and stood at 10.6 billion euros. While the current account deficit was financed by short term capital inflows, the growth in the current account deficit and the poor levels of Foreign Direct Investment (FDI) raised concerns regarding the sustainability of the crawling peg exchange rate regime (SPO, 2001).

A.4. SWOT ANALYSIS

Strengths	**Weaknesses**
• Open, competitive economy well integrated into the world economy • Generally well functioning market economy • A solid industrial production base • Growing population and purchasing power, and hence, demand	• Macroeconomic instability High budget deficits High inflation High debt stock & interest payments High volatility in investment and growth • High unemployment / Low labour market participation rates / Lower labour market participation rates among women in the urban labour markets • Significant share of employment in agriculture
Opportunities	**Threats**
• Structural reforms well under way • Macroeconomic stabilization package in effect • Flexible exchange rate regime • Strong potential for manufacturing exports	• Prolonged recovery from economic crisis • Political instability • Social unrest • Growing Public budget deficit • Insufficient FDI flows

The most relevant weakness preventing further development of IS in Turkey is the macroeconomic stability that keeps the country from using its potential and suppresses its strengths. Given that the economic stabilisation programme of 2001 began to produce positive results towards increased macroeconomic stability over the long run and better growth performance, Turkey should once again be expected to take giant steps towards further economic and social development in the next decade or so. The upcoming transformation is likely to be as large as the transformation the country experienced in the 1980s, and may end up more than compensating the lost decade of the 1990s. One major weakness that may take longer than a decade to be fixed is likely to be the significant share of employment in agriculture. Even though this share is certain to decline continuously, it is unlikely that it will go lower than 15-20% in the next decade, remaining higher than most other countries that are as developed as Turkey.

B. NATIONAL AND REGIONAL INFORMATION SOCIETY POLICIES

IS related policies in Turkey are typically decided on the national scale. Local governments have little interest in and feedback to the national policy-making process in this area. As also stated in the country paper of Turkey to the OECD on "eGovernment: Organising for Integration" prepared in 2003, Turkey's national approach to eGovernment is characterized as more centralized. Although, there have been eGovernment-like applications carried out by government agencies and provincial governments, such as Yalova Municipality[4] the attempts have been scattered and insufficient. As emphasised in above mentioned document, the Government believes that eGovernment strategies and policies need to be developed and coordinated centrally; and after setting the general policy and strategies, implementation could be left to individual administrations in central government. The Government's view is that this approach creates a common understanding to eGovernment and an interoperable and secure information system will be assured while challenges of this approach are likely to be the difficulty designing such a huge system and administrative resistance.

However, considering the scale of the country, there is obviously a significant need for development and implementation of IS policies and strategies at regional level. To date there has not been any attempts on this issue by regional authorities except Yalova Municipality as mentioned above. The same is also true for other policies as well, for instance there are not any regional innovation policies and strategies in the country. In fact, centralised policy making and governance has always been the governments' approach in Turkey.

B.1. Institutional settings and their influence on IS policies

Due to its long history of institution building, Turkey has a very well-developed institutional structure and a well-educated bureaucracy. As stated in a recent report "Innovation Policies in Seven Candidate Countries: the Challenges" published by the European Commission (Enterprise DG, 2003), among the CCs "only Turkey has an institutional structure with a long tradition of policy development in the field of innovation. In addition, there are no government agencies with a direct remit for innovation policy in any of the seven countries except Turkey."

Despite such an advanced institutional structure, it is difficult to argue that this well-developed structure always functions efficiently. In fact, the policy-making process in Turkey and the process of policy implementation can best be characterised by the lack of punctuality and continuity –whether in the area of IS policies or in other areas– resulting from the political instability and the extended periods of uncertainty created by the frequent transfers of power from one coalition government to the other.

[4] Yalova Municipality started an IST based city development project in 1998. The project has become more popular in reconstruction of the city following the earthquake in 1999. Commitment of all stakeholders in Yalova has been provided by the Governorship and Municipality. A project office was established and the Yalova IST Foundation was founded to implement the project. e-Municipality platform was established and became operational, ICT companies has been attracted to the city and training seminars and conferences at the whole range of schools are organised with participation of young successful entrepreneurs as speakers. It has been also been designated as the pilot city under the e-Europe+ Project.

The Turkish economy has performed especially poorly in the 70ies and 90ies mainly due to political and economic instability. During these two decades, early elections were repeatedly called for to replace weak coalition governments but they consistently failed to break the deadlock, producing a new coalition government each time. The 1980s, on the other hand, turned out to be the decade of major reforms and strong performance in many of the economic indicators, thanks to the political stability Turkey enjoyed under politically strong, single-party governments led by late Prime Minister Turgut Ozal.

Among other things, the 80ies witnessed a communications revolution with significant achievements with regard to the physical infrastructure and supply of services: Just prior to 1980, telephone line density had reached to only about 2.5 lines per 100 inhabitants. People were waiting for a long time (sometimes years in densely populated urban areas) to get a telephone line, as the number of lines was growing at the very modest rate of 50,000 lines a year. More than 72% of Turkey's 40,000 villages and rural settlements had no telephone service at all (Wolcott and Cagiltay, 2001). Thanks to the steps taken by Ozal governments, Turkey became one of the few countries in the world having access to all state-of-the art telecom services including direct dialling for long-distance and international calls, and Turkish Telecom became one of the most successful operators in the world in terms of raising teledensity across the country during the 1980s (Ministry of Transportation and Communications–MTC, 1999). With the arrival of the 1990s, on the other hand, Ozal stepped down as the Prime Minister and got elected the President, a prestigious but politically weak position, and election results in Turkey returned the country to the tradition of coalition governments. The 1990s witnessed a gradual broadening of the gap between Turkey and the rest of the world in terms of the quality of telecom infrastructure and services.

As suggested by the recent theoretical empirical studies in the political economics literature, political instability and frequent elections directly inflict serious negative effects on the economy. They make the introduction of bold structural reforms difficult, since short-sighted politicians typically avoid taking politically risky steps prior to any upcoming elections, no matter how much they are needed for sustainable growth in the long-run. They also disturb macroeconomic balances by creating additional incentives for overspending of public funds prior to elections. Once they occur, consequences of serious macroeconomic imbalances such as high rates of inflation and interest rates fill up the policy agenda, lowering the priorities of other policies. Turkey has, in fact, been a living example to such interaction between political and economic instability, particularly during the 1970s and the 1990s (Sayan and Berument, 1997; Uzun, 2003).

In many instances, this unstable environment has contributed to failures in policy-making, -coordination and -implementation in many areas including the IS policies through at least three channels. First, policies that are not likely to have immediate favourable effects for sizable sections of the electorate have lost their priority in the policy agenda, causing sometimes significant delays in the legislation or introduction of such policies. Secondly, the uncertainties arising about the continuity of political support to certain policies in the aftermath of every election have caused delays in implementation, even when these policies had been legislated or introduced prior to the elections. Thirdly, individuals or teams in the bureaucracy who played key roles in the policy-making and -implementation processes have often been replaced before significant progress has been achieved, causing long lags until the new individuals or teams get a hold of the issues.

Perhaps the best example illustrating the points made in the preceding paragraphs is the delays experienced in the privatisation of Turkish Telecom. Turkish Telecom was separated from the PTT and turned into an independent company in the 1980s, as part of a restructuring effort directed toward its privatisation. This was one of the early attempts in the world to privatise an incumbent operator, and due to its success in the expansion of the basic telephone service, Turkish Telecom appeared easy to privatise for a hefty amount. Yet, an opposition alliance was formed against the privatisation of Turkish Telecom by leftists and nationalists around the rhetoric of national interests. Several drafts enacted by the Parliament for this purpose were turned down by the Constitutional Court (Supreme Court) on legal technicalities upon the appeals of this opposition front led by a nationalist/leftist professor of constitutional law, who later got elected as a Member of the Parliament, serving as the Minister of Foreign Affairs for a while. For every draft turned down, the revisions were made to address the Constitutional Court's concerns but the governments that tried to have the revised draft enacted lost the Parliamentary support to the new draft due to a political crisis or an early election before they have had a chance to go ahead with the privatisation.

More than a decade later, Turkish Telecom is still a public-owned company, despite the eventual resolution of legal problems. Even if the next attempt to privatise it turns out to be successful, it currently is worth a fraction of what it was worth initially. As to be discussed in the following sections, failures to privatise Turkish Telecom not only cost the receipts from its sale, but also hindered the development of IS in Turkey.

Another example to the slow working legislation process in Turkey is the delays in frequency allocations to private broadcasters by the Supreme Council of Radio and Television Broadcasting (SCRTB). The major reason behind the establishment of the Council was to put an end to the frequency chaos experienced at the beginning of the 1990s when hundreds of unlicensed private radio and TV stations suddenly invaded the airwaves by renting broadcasting times from various satellite operators abroad. Even though it has been nine years since the SCRTB became operational, the frequency allocation process could not yet be completed due to various legal problems (see also Section F).

The main actors in the institutional setting for IS policies in Turkey comprise the Telecommunications Authority, the Ministry of Transportation and Communications, the National Council for Information Technologies, the Internet Supreme Council, the Supreme Council of Science and Technology and the State Planning Organisation through its Information Society Department.

The Telecommunications Authority was established in August 2000 as an independent body. On 28 August 2001, the Authority began to perform its duties including the issuance of a tariff regulation to set the limits for the regulated activities of the incumbent operator or to any operator that may have significant market power, and renewal of the concession agreements with the mobile operators (see also Section F). The Ministry of Transportation and Communications (MTC) is responsible for setting the general guidelines and the overall sector policy.

The National Council for Information Technologies is an independent body dealing with the coordination of IST/ICT policies. The Council was made up of the Prime Minister, one of the State Ministers (Ministers without portfolios), the Minister of Transportation and Communications, Joint Chiefs of Staff representative, the Undersecretaries for State Planning Organisation, Foreign Trade, and Treasury, Secretary General of the National Security

Council, the Chairman of the Supreme Council of Radio and Television, and the President of TUBITAK representing the stake holders from the public, and ten additional members to represent other stake holders. These additional members were selected from among the candidates nominated by the related agencies, companies and the NGOs by the following rule:

- 3 members out of 6 nominated by the Electronics Industry Association, the Association of Electronic Equipment Manufacturers, and the Centre for Electronics Industry Specialists; 2 members out of 6 nominated by the Turkish Foundation for Informatics (TBV), Turkish Informatics Association (TBD), and the Turkish Industrialists' Association of Informatics Producers (TUBISAD) to represent the electronics and informatics industry's interests;
- 2 members out of 8 candidates nominated by the Turkish Telecom Inc., private GSM operators Turkcell and Telsim,[5] and the Association of Internet Service Providers to represent the service providers' interests;
- 2 members out of 8 candidates nominated by the Chamber of Electrical and Electronics Engineers (EMO), the Union of the Chambers of Commerce (TOBB), Turkish Industrialists' Association (TUSIAD), and the Turkish Bankers' Association to represent the users' interests, and finally
- 1 member out of 2 candidates nominated by the Technology Development Foundation of Turkey (TTGV).

It must be noted that while this composition of the "National Council for Information Technologies" provides a rather extensive list of the stakeholders, it does not include the schools and universities. Although this seems to be a surprising exclusion, the inclusion of TUBITAK might have been considered as a substitute, since TUBITAK is also the creator and operator of National Academic Network and Information Centre (ULAKNET and ULAKBIM).

Another body involved in the Turkish IS policy structure is the Internet Supreme Council (ISC) that was formed January 1998 to interact with the decision-makers in the public sector and contribute to the policy formulation process at a consulting capacity. One of the first decisions that the ISC put into effect was the launching of an internet week to be observed every year, for the purpose of increasing the popularity of internet through various promotional activities, and providing a forum for discussion of internet related issues. In practice, the internet weeks have been extended into fortnights, and internet week activities have significantly contributed to a wider recognition of the usefulness of internet across all regions and all sections of the society. The formation of a work group for resolution of problems and conflicts related to the distribution of domain names, and the development of some measures against SPAM can be cited among other achievements of the ISC. The connection of all public libraries across the country was an area where the Council was less successful due to the lack of resources which became more severe after the recent economic crises. The ISC has also pressed for the cancellation of VAT on PC purchases and internet connection charges to make them more affordable but could not achieve it, due to the austerity measures required to fight with the economic crises. Details on the structure of the ISC are presented in Annex B2.

The Supreme Council of Science and Technology (SCST) is the highest body in charge of decision-making on science and technology (S&T) and innovation policies in Turkey. As IS

[5] Turkcell and Telsim were the only two GSM operators at the time of the decision taken for the formation of the council. They were later joined by Aria and Aycell.

policies are considered in integrity with the innovation policies, the SCST has a role for decision-making on IS policies that are embedded in S&T and innovation policies as explained in Section B2 below. The SCST meets under the chairmanship of the prime minister, and TUBITAK (Scientific and Technical Research Council of Turkey) functions as its permanent secretariat. The SCST is the decision-making body that asked for the preparation of the National Information Infrastructure Master Plan for Turkey back in the mid-1990s as well as other IS policy measures as mentioned in Section B2. It is also the body giving the directives for the formation of an independent "National Council for Information Technologies" to meet for the coordination of IST/ICT policies.

Recent arrangements in IS infrastructure covers establishment of the Information Society Department in March 2003 under the State Planning Organisation (SPO). The Department is responsible for coordination of the eTransformation Turkey Project (see Section B2), the ICT investments of public institutions and the studies for determination of the strategies for transition to IS. In addition, an Advisory Board for the eTransformation Project was established in May 2003 with 41 members from public institutions, non-profit organizations and universities to increase the level commitment and success.

B.2. Chronological description of IS policies[6]

IS Policies of Turkey are mainly embedded in its five-yearly development plans and in the S&T and innovation policy documents. The first implications of the IS policies are found in the Sixth Five-Year Development Plan (1990-1994). The plan foresees IS policy actions covered under the education, S&T and information technologies policies. The project on “Impetus in Science and Technology” (1995), which was embedded in the Seventh Five-Year Development Plan (1996-2000), as one of the “Fundamental Structural Transformation Projects” is the most comprehensive document that places “transformation to an IS” at the heart of the development targets.

Similarly, the IS related policy actions have been broadly introduced in the S&T Policy document in 1997. The decisions taken by the Supreme Council of Science and Technology (SCST), the highest level authority for governance of S&T and innovation policy, in its meeting in August 1997 covers (a) preparation of the National Information Infrastructure Master Plan (NIIMP), (b) establishment of the Telematic Services Network, (c) setting up of two internet services, one for public and one for schools, (d) establishment of the National Information Technologies Council, (e) formation of the national academic network and information centre, (f) dissemination of eCommerce in the country, and (g) stimulation of the establishment of internet cafes for public use. IS policy actions were reviewed and revised by the SCST annually following its decisions of August 1997.

In line with the increased level of IS policy developments started in 1995, the Prime Minister’s Office assigned the MTC to prepare the National Information Infrastructure Master Plan (NIIMP) in January 1996. TUBITAK was requested to act as the secretariat unit. The Master Plan aimed at developing policy actions and strategies for enabling Turkey’s transition to an information society. The Plan was finalised by the end of 1998 with contribution of public and private sectors and non-governmental organisations. An update study was carried out by May 1999 before the MTC gave the final approval in June of the same year. The final document proposes policy actions and strategies under three main headings; (a) Infrastructure

[6] Unless otherwise noted, the discussion in this section relies mostly on Akgul (2001), Gungor and Evren (2002) and Pak (2001).

Planning, (b) National Value-added Instruments, (c) Institutional Restructuring, which are supported with a section on detailed analyses of the situation in the World and in Turkey.

Preparation studies of the NIIMP were carried out by conducting the most widely covered research with contribution by the stakeholders in the field of IS. During the course of the study, more than 200 institutions were interviewed and their views were incorporated into the Plan. Two two-day workshops with the participation of 182 experts and stakeholder representatives were held. Fourteen working groups were set up for various purposes. A large-scale survey designed to monitor and evaluate the accessibility and capability of users was taken in 1998 to guide the preparation of NIIMP by the MTC. The survey was the first of its kind on this scale in Turkey and intended to collect data on local characteristics of users with respect to ownership, capabilities and other social aspects, by surveying the urban household population living in the cities (as opposed to small towns and rural areas) which currently make up about 65 percent of all households. One of the main objectives was to determine the extent of dissemination and the usage of communication technologies by family characteristics, and to use the information obtained at the household level in the formulation of national policies (MTC, 1999).

The Eighth Five-Year Development Plan (2001-2005) defines itself as the "fundamental instrument guiding the national efforts towards providing Turkish people with the requirements of IS". Thus, the Plan broadly covers IS policies and strategies for the period in question. It emphasises the essence of knowledge as the most important production factor in building up the IS. Turkey's candidate membership to the EU is also underlined as an important opportunity for meeting the conditions required by the IS. In the Plan, the IS policy is incorporated mainly with the human resources development, innovation, S&T and investment policies.

During the preparation studies of the Eighth Five-Year Development Plan, the "Specialization Committee on Information and Communication Technologies and Policies" that was formed by the representatives of related public bodies, umbrella organizations and business enterprises prepared a detailed document that consists of proposals for implementation of IS policies. This report, prepared in 2001, forms the building blocks of the IS related policies and strategies in the Development Plan.

Another strategic document on IS was issued in May 2002 as a result of the ICT Convention organised under eTurkey initiative. The ICT Convention was held between May 10-12, 2002 with the purpose of formulation of the strategies and determination of an action plan for IS transition, as well as penetration and dissemination of ICT. The Convention was organised jointly by the Prime Ministry and NGOs representing the ICT sector. The draft reports proposing policy and strategy actions prepared by six main working groups (education, legal framework, eGovernment, e-economy, development of the ICT sector, communication infrastructure, and R&D) with participants from public sector, academia, business sector and NGOs were opened to debate during the convention. The results of debate were transformed into a final declaration document that presents IS policy actions and strategies.

Although there has been a large number of IS policies and strategies developed since the beginning of the 90ies, there has been little progress in implementation side. The needs and priorities of organisations entitled to implement the policy actions affected the course of the IS transition projects and this did not resulted in great success (SPO, 2003). Nevertheless, IS

policy and strategy development studies have been the exercises implemented with the widest participation of all stakeholders and resulted in an important learning process.

Most recent efforts in design and implementation of IS policies are covered under the "eTransformation Turkey Project" started by the Government on February 27, 2003. The Project aims to coordinate IS activities that were previously carried out under different topics by different institutions. It has been declared as one of the most significant projects under the Urgent Action Plan (UAP) of the present Government's Programme. In line with the Government's schedule, the initial focal point in this project is the Short Term Action Plan (STAP), covering the period of 2003-2004. First action item of the STAP is the preparation of an "Information Society Strategy" in 2004 that will Turkey's transition to information society and to knowledge economy (SPO,2003).

The ongoing study "Vision 2023" that has been launched in 2002 under the coordination of TUBITAK to design the science, technology and innovation policies and strategies of Turkey for the 2003-2023 period also seek to integrate IS policies with S&T and innovation policies. While the national technology foresight study being implemented under Vision 2023 has a panel on ICT, all other panels such as education and human resources, transportation and tourism attach special importance to IS and ISTs. The Project is at the stage of completion and formulation of the science, technology and innovation policy and strategy will be done in the second half of 2004.

B.3. Driving motivations of IS policies

The driving motivations behind its IS policies is to shift Turkey's competitiveness from labour-intensive products to human-capital intensive products by putting IST into use to improve the human resource potential of the economy and living standards of its people in a sustainable manner. Accordingly with these motivations, when the Supreme Council of Science and Technology (SCST) called for preparation of the National Information Infrastructure Master Plan (NIIMP), it formulated the IS policy goals for Turkey as:

- Maximising socio-economic benefits of improvements to the national information infrastructure within a sustainable development perspective,
- Increasing the share of domestic value-added in hardware, software and content development and communications,
- Increasing the shares of Turkish companies in the global informatics market, and to become a regional leader in this area,

SCST defined the goal of the work leading to the preparation of the NIIMP as development of policies and structures to make achievement of these targets possible.

Policy targets set in the Eighth Five-Year Development Plan supports the same motivations. In accordance with the Plan, it is expected that formation of information society will create positive impacts as regards economic and social aspects and speed up economic growth, increase efficiency, create new fields of activity and employment, increase and enhance education opportunities, improve provision of other services in the fields of health and social security and enable easier access for individuals to cultural opportunities. Transition to IS is also seen as one of the major drivers in preparing Turkey for the future and in attaining a more effective status within the world. The candidate membership position of Turkey in the European Union is recognised as an important motivation for transition to IS as well since the

actions being taken for the full membership eventually leads to setting up of the framework conditions of the IS.

In line with the above-mentioned driving motivations, the objectives in recent IS policies (under eTransformation Turkey Project) are set forth as to increase the competitive advantage of the country, and to shift to a democratic, modern and prosperous society.

B.4. Objectives and results

Despite a wide agreement on the desirability of the goals and objectives mentioned in section B31 above, the steps taken towards these goals have not been as big and frequent as they should be due mostly to political instability, on the one hand, and due to economic crises, on the other. While the political instability slowed down the policy-making process needed to resolve certain problems and overcome certain difficulties, the economic crises prevented the achievement of certain policy goals through two channels: First, they caused significant reductions in the purchasing power of the Turkish public, and secondly, required substantial cuts in government spending under the austerity measures introduced to stabilise the macroeconomic balances, as discussed in previous sections.

The rest of this section summarises the specific objectives and achievements in certain areas under three broad headings: Legal arrangements, human resource development, and infrastructure development. The character coding used below distinguishes areas where significant or considerable progress has already been achieved (**bold**) from areas with some (underlined) or little progress (*italic*), reserving the regular characters for areas with no progress. The areas where there is "some" and "little" progress are being developed by the related authority. They are covered under the STAP of the eTransformation Turkey Project to a large extend. (The evaluations have been made by the author based on information compiled from a large number of sources such as the web sites of ministries and government agencies, and personal observations.)

LEGAL AND INSTITUTIONAL ARRANGEMENTS

GENERAL:

Institutional set-up for science and technology policies

Legal and institutional arrangements for systematic funding and support to R&D activities

Legal and institutional arrangements for reversing the brain drain

Legal arrangements for requiring local content in IST/ICT related public procurement

MINISTRY OF EDUCATION:

Accreditation of degrees from TV-based long-distance education through open university and open schools programs

MINISTRY OF FINANCE:

Payment of all taxes over internet (through the banking system)

Availability of financial resources for increasing popularity of IST/ICT

Promotional VAT reductions in PC purchases and internet connection charges

Promotional VAT reductions in e-Trade

Promotional VAT reductions in e-Drug and e-Insurance

MINISTRY OF JUSTICE:

Legal base for eSignature

Changes to Turkish penal code for internet-based criminal activities

Legal base for establishment of virtual notaries

MINISTRY OF INDUSTRY AND TRADE:

Legal base for the establishment of technoparks, and the provision of incentives to be provided to hardware and software developers in technoparks

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS (in conjunction with the Telecom Authority):

Legal base for the privatisation of Turkish Telecom

Legal base for regulation and competition in all telecom services

Regulation for digital (re-) broadcasting

INFRASTRUCTURE DEVELOPMENT

GENERAL:

Creation of an on-line legislative info bank for access to Official Gazette, Laws, Regulations, Circulars etc.

On-line access to public procurement notices, invitations for tenders and bids, results of tenders and bids etc.

Establishment of a dedicated network for the entire public administration domain: kamu.net

Title Deed and Cadastre System

MINISTRY OF EDUCATION:

TV-based long-distance education through open university and open schools programs

Establishment of vocational schools for training support personnel for information and communications industries

Connection of schools to internet

Creation of a network dedicated to primary and secondary school education

MINISTRY OF FINANCE:

Individual searches for tax payments that are due

Payment of certain taxes over internet (through the banking system)

MINISTRY OF HEALTH:

Drug distribution management for holders of public health insurance schemes

Connection of public health service establishments to internet

e-Health smart cards and accessibility of customer records over the net

Blood and tissue net

The development of infrastructure for telemedicine

MINISTRY OF INDUSTRY AND TRADE:

Support to the establishment of technoparks

Dedicated network for SMEs

MINISTRY OF INTERIOR:

Filing passport applications over internet
Checking for traffic violations over internet
Payment of traffic tickets over internet
Connection of local headquarters and police stations to internet
Filing residence and work permit applications over internet for foreigners

MINISTRY OF JUSTICE:

Searchable Database for Criminal Records (for clearances that most employers require from job applicants)
Computerisation of courts

MINISTRY OF LABOUR AND SOCIAL SECURITY:

Payment of social security contributions over internet (through the banking system)
Drug distribution management for holders of public health insurance schemes
Searchable database for records of social security payments and dues
Searchable database for vacant positions for job seekers
Filing for retirement and unemployment benefits over the net

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS (in conjunction with Turkish Telecom and Telecom Authority):

Sea traffic management in Marmara and the Straits
Air Traffic management and integration with Eurocontrol
Traffic and fleet management in highways
Frequency allocations to private TV channels and radio stations (in conjunction with the Supreme Council of Radio and Television)
Packet switching to replace circuit switching
Extension of cable TV network
Terminals for public use
Frequency planing for wireless internet

MUNICIPALITIES:

Payments of charges for water and utilities over the net (through the banking system)
City traffic management
Filing for construction, residence, business permits etc. over the net

SCIENTIFIC AND TECHNICAL RESEARCH COUNCIL OF TURKEY (TUBITAK):

Dedicated network for Academic and Research Institutions

HUMAN RESOURCE DEVELOPMENT

GENERAL:

Systematic funding and support to R&D activities
Legal and institutional arrangements for reversing the brain drain

MINISTRY OF EDUCATION:

Availability of affordable life-learning opportunities for computer and internet use across the country

TV-based long-distance education through open university and open schools programs

Establishment of vocational schools for training support personnel for information and communications industries

Funding and support to private content producers of educational software

Internet-based long-distance education (in conjunction with some public universities)

Internet-based long-distance education through public schools

Creation of a network dedicated to pre-tertiary education

MINISTRY OF FINANCE:

Tax incentives R&D employees in technoparks

Funding for e-Education

MINISTRY OF INDUSTRY AND TRADE:

Provision of all kinds of info services to SMEs over the net (through KOSGEB and its subsidiary KOBINET)

MINISTRY OF INTERIOR:

Formation of computer literate police detective and officer teams for collection of computerised evidence

MUNICIPALITIES:

Creation of affordable life-learning classes for computer and internet use

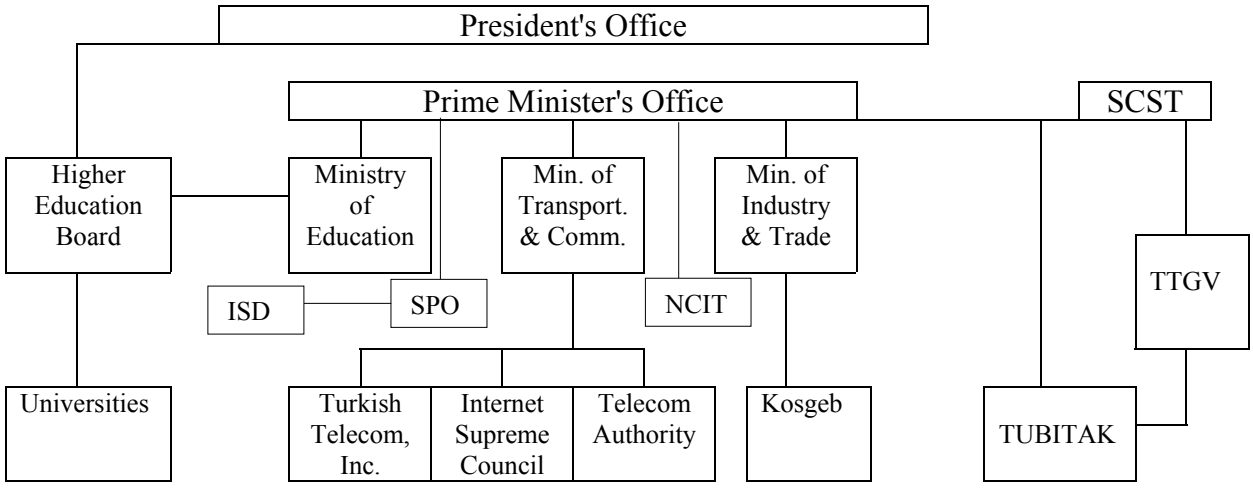
B.5. The institutional setting behind the policies

Given the scope of IS policies, and the multi-faceted and far-reaching nature of the effects of these policies, the institutional setting where these policies are developed or implemented is made up of several bodies. Furthermore, there is a strong and complicated interaction between education and innovation policies, and economic, financial and social policies, as well as sectoral policies. This section presents an overview of the institutional structure in Turkey.

The key elements of the institutional setting behind the IS policies could best be observed from the organisation chart below.[7]

[7] The chart gives only a partial picture of the public and semi-public bodies involved in the decision making process for IS policies.

Figure B1. The Institutional Setting behind the IS Policies



SCST : Supreme Council of Science and Technology
TTGV : Technology Development Foundation
TUBITAK : Scientific and Technical Research Council of Turkey
KOSGEB : Small and Medium Industry Development Organisation
NCIT : National Council for Information Technologies
SPO : State Planning Organisation
ISD : Information Society Department

In addition to the main actors in the institutional setting for IS policies in Turkey given in Section B1 above (the Telecommunications Authority, the Ministry of Transportation and Communications, the National Council for Information Technologies, the Internet Supreme Council, the Supreme Council of Science and Technology and the State Planning Organisation through its Information Society Department), TUBITAK (Scientific and Technical Research Council of Turkey), TTGV (Technology Development Foundation of Turkey) and KOSGEB (Small and Medium Industry Development Organisation) play important role in the field. While sectoral ministries also affect the process of policy making through their feedbacks related to their portfolios, the Ministries of Industry and Trade, and Communications and Transportation stand out as key elements at the ministerial level. On the side of national education system are the Ministry of Education that is in charge of primary and secondary education, and the Higher Education Council (HEC) that oversees tertiary education.

B.6. The commitment of private and public actors

In Turkey, there is widespread commitment to the development of IS of both private and public actors, and the support for IS policies is almost unanimous. As underlined in Section B2, eTransformation Turkey Project is one of the most significant projects under the Urgent Action Plan (UAP) of the Government's Programme. The Short Term Action Plan (STAP) prepared in this respect for the period of 2003-2004 covers necessary resource allocations and clarifies the responsibilities. For decades, the challenge to further development of IS in Turkey has not been the lack of commitment but failures in policy-making and coordination such as the delays that occurred in the restructuring and privatisation of Turkish Telecom, and the lack of resources, as discussed before. In fact, it would be realistic to argue that the lack of resources has often been the most binding constraint.

Reflecting this joint commitment of private and public sectors is the rather participatory nature of policy-making in the area of IS policies and continuous dialogue and cooperation between private and public actors. As exemplified by the formation of an ad hoc committee called "National Council for Information Technologies" (NCIT) during the early stages of the preparatory work towards the National Information Infrastructure (Section B1 and B2), IS policy-making is one of the leading areas where dialogue and cooperation are at exemplary levels, and interaction is strong between private and public actors.

Another good example to illustrate this point could be given by considering the formation and composition of the Internet Supreme Council (ISC). The Council was formed following the suggestions from the private sector, universities and the NGOs to create a forum for discussion and resolution of issues about the creation of TURNET (later on replaced by TTNET) as an internet service provider affiliated with Turkish Telecom. The idea was to allow all stake holders to interact with the decision-makers in the public sector and contribute to the policy formulation process at a consulting capacity and the Ministry of Transportation and Communications agreed to host the Council, and work with it. With such a wide representation of the stake holders, the ISC indeed provided to be very useful as a forum to bringing together the TTNET representative with all stake holders, allowing them to work out their problems and develop solutions, and it continues to meet to discuss issues related to IS policies on a regular basis.

B.7. Specific important actors

TUBITAK:

Founded in 1963, TUBITAK is the leading organisation that is responsible for promotion, development, organisation and coordination of scientific and technological R&D activities in Turkey. It is the S&T and innovation policy making body. TUBITAK functions under the portfolio of the Prime Minister, and has administrative and financial autonomy.

Of ten research institutes of TUBITAK, Information Technologies and Electronics Research Institute (BILTEN) is the one that focuses on IST/ICT related research. BILTEN houses 12 research groups including the "Information Society Policies, eCommerce and Information Security Group" which studies ICT policies and their impacts on the economy, society and technology through a multidisciplinary approach. In addition to these activities, BILTEN's "Information Society Policies, eCommerce and Information Security Group" is involved in the development of information security technologies needed for the growth of eCommerce and on-line communications, and has already released several versions of public key cryptography products it developed. Complementary to these activities carried out at BILTEN are the activities that TUBITAK's "National Electronics and Cryptology Research Institute (UEKAE)" is involved with This is the institute established to provide technical support to basic and applied research for the technologies needed in the areas of information security and micro electronics. Detailed information TUBITAK and its research institutes are given in Annex B3.

Turkish Telecom, Inc. and Telecom Authority

In addition to the information already given in Section B1, a more detailed discussion about Turkish Telecom, Inc. and Telecom Authority can be found in Section C.

It may be worth noting here again that Turkish Telecom has in general failed to meet user expectations in areas other than basic phone services. It delayed the development of national information infrastructure by lagging behind in improvements to services to be provided over the basic telecommunications network covering the ISDN, IN (intelligent network) and other services. Particularly after the observation of its inadequacy in the provision of access to internet, the privatisation of incumbent operator and liberalisation of the market were introduced to the policy agenda once again after the 1980s attempts to privatise it. Until 2004, there has been little progress in that area, however, except for the issuance of two licences to private GSM operators (Turkcell and Telsim) initially and then to Aria, a Turkish-Italian joint venture. To facilitate its privatisation, Turkish Telecom also created its subsidiary, Aycell, which later joined the other three GSM operators. As of January 1, 2004, Turkish Telecom's monopolistic status was removed and seven private telecom companies have entered in the market (see Section F). As an additional step to prepare for the privatisation of Turkish Telecom, a new, independent regulatory body called the "Telecommunications Authority" was established to regulate the telecommunications sector. The Telecommunications Authority became operational in August 2000 and began to perform its duties including the issuance of a tariff regulation on 28 August 2001 to set the limits for the regulated activities of the incumbent operator or to any operator that may have significant market power, and renewal of the concession agreements with the mobile operators (also see "Regulatory Reform" under Section F).

TTGV

Technology Development Foundation of Turkey (TTGV) was founded in 1991 as an independent, non-profit, non-governmental organisation created jointly by the private and public sectors in order to raise the industrial sector's awareness of the benefits of R&D activities, and to fund the technology development project proposals of the industry. In funding activities it uses the resources provided by the Government through the Under Secretariat of Treasury (from the World Bank resources) and the Under Secretariat of Foreign Trade. TTGV serves all companies in the industrial and information technology sectors (including software houses), by making itself as accessible as possible through simplified application procedures, and keeping openness and transparency among its primary principles of operation.

TTGV has so far provided a total of about USD 133.4 million to 386 projects involving technology or product development or process innovation. This is a very small amount compared to the R&D spending of the business sector in Turkey[8] and to the other countries[9]. An important reason for this is the conditions set for financing individual projects of enterprises (finance is provided as loan with a 4% upfront and 5% monthly service fee out of the total finance provided. Provision of collaterals is also required in most of the cases, especially for SMEs).

Two points are worth mentioning about the support provided by the TTGV. First, by the end of 2003 19% of all projects supported were proposed by the companies operating in the IT sector while the share of funding is 18% in total funding provided for all sectors. Secondly, in terms of the regional breakdown, Marmara region has a dominant share and is followed by the

[8] According to the survey of the State Institute of Statistics, R&D spending of business sector *in 2000* is USD 191 million.

[9] To give an idea, *annual* budgets of similar organisations in Spain, Ireland and Hungary are €240 million, €180 million and €96 million respectively.

Central Anatolia region with a much smaller share. This is in fact natural, since Marmara region includes Istanbul which is the industrial, technological and cultural capital of the country and has a population of about 11 million. The region also includes Bursa, Kocaeli and Sakarya, the other leading towns in terms of industrial concentration. The Central Anatolia region, on the other hand, is where Ankara, the administrative capital, is located and with a population of about 4 million, this town is the second largest in Turkey and hosts a considerable number of companies.

KOSGEB:

KOSGEB (Small and Medium Industry Development Organisation) was founded in 1990 as a public agency associated with the Ministry of Industry and Trade, with the purpose of supporting enterprises operating in various branches of the manufacturing industry by offering solutions to their technical and economic problems, and by helping them attain higher levels of product quality, employ more efficient technologies and make the best use of market opportunities. It maintains close and direct relations with and offers a wide spectrum of services to the SMEs almost in all areas from start-up to production and marketing.

For these purposes, KOSGEB provides its services through specialised service centres called:

- Small Enterprise Development Centres
- Technology Development Centres (Tekmer)
- Euro Info Correspondence Centre and Kobinet

Kobinet has been designed as the national subnetwork of Euro Info Centre Network (http://www.kobinet.org.tr). It provides all services of the Euro Info Centre Program, including the e-Business services. Kobinet provides value added network services such as company profiles; information on the EU legislation and CE marking; reports and statistics on the economies and sectoral policies of the EU member countries, etc. through the Euro Info Centre at KOSGEB. In addition, Kobinet is involved in the development of business-to-business eCommerce relations among SMEs by building an e-marketplace, where the virtual SME shops are grouped according to the EU's product coding system. It brings the SMEs and the organisations serving to SMEs together in a virtual environment, in order to create eCommerce awareness and to contribute to the development of business-to-business activities among SMEs

B.8. Conclusions

- IS policy development exercises date backs to the beginning of 90ies which has been realised at exemplary levels with the widest participation, cooperation and interaction of all stakeholders and resulted in an important learning process.
- On the other hand, compared to the scale of the country, there are not regional IS plans and policies.
- IS policies are integrated with the national innovation, human capital development, science and technology and investment policies.
- Despite to the amount of the IS policies and strategies prepared, implementation side remains weak due to lack of coordination, follow up and commitment of required resources.

- Recent efforts by the Government under the eTransformation Turkey Project seems promising as it has been structured drawing lessons from previous problems in policy implementation.

B9. SWOT Analysis for Section B

Strengths	**Weaknesses**
• Well developed institutional structure with recently established regulatory bodies ready and willing to take action in the required directions • Public and private parties strongly committed to the development of IST • Participatory decision making involving stake holders from private sector, NGOs, Unions • Relatively long tradition in design of IS policies and strategies with participation of all stakeholders	• Political instability, tradition of weak coalition governments, frequently held elections and frequent changes in critical posts • Macroeconomic instability and lack of funds due to cuts in public spending • Delays in Turkish Telecom's privatisation • Highly centralised decision making process
Opportunities	**Threats**
• Structural reforms well under way • Economic growth rate picking up • Increasing competition • Flexible exchange rate regime • Single party government in power • Popular support and political determination for EU membership • Effective privatisation of TT • Implementation of the eTransformation Project and the STAP in the short-run	• Prolonged recovery from economic crisis • Further delays in privatisation of Turkish Telecom • The Government fails in implementation of the action plan and meeting the targets in eTransformation project

C. INDUSTRIAL DEVELOPMENT AND COMPETITIVENESS

C.1. Structure of industrial production

The most significant economic reform movement in recent history of Turkey was started with the opening of a major structural adjustment package in 1980 when primary agriculture in Turkey contributed 25% of the real GDP; employed 60% of the civilian workforce and accounted for 57% of total exports. Steps taken to increase market-orientation of the economy began with a major devaluation of the Lira and were followed by the introduction of a set of measures to liberalise foreign trade and domestic commodity and financial markets. With the adoption of additional measures to raise the share of the private sector in economic activities, the program represented a break for Turkish economy away from an import substitution-based development strategy to an export-oriented strategy. Legal arrangements were made to facilitate improved market access for private agents and to allow for the privatisation of state-owned enterprises (Sayan and Demir, 2003). The reforms facilitated a faster decline in the relative significance of agriculture in the economy, with this sector's respective real GDP, employment and exports shares coming down to 17%, 47% and 17% in 1990, and continuing to fall further to reach 13%, 35% and 7% in 2000. During the same period, the corresponding shares of industry and services continuously increased (see the table below).

Table C1. Shares of Sectors in Merchandise Exports, Real GDP and Employment

Year	**Share of Agriculture in** (%)			**Share of Industry in** (%)			**Share of Services in** (%)		
	Real GDP	*Employment*	*Total Exports*	*Real GDP*	*Employment*	*Total Exports*	*Real GDP*	*Employment*	*Total Exports*
1980	25.1	60.0	57.4	22.3	13.0	42.6	52.6	27.0	42.6
1990	17.0	46.9	17.4	26.7	15.6	82.6	56.3	37.5	82.6
2000	13.4	34.9	7.2	28.4	18.1	92.8	58.2	46.9	92.8

Source: State Planning Organisation (SPO).

The changing orientation of Turkish economy and increasing degree of openness led to a boom in exports which were mostly concentrated in agricultural and livestock products prior to 1980. The value of exports increased from $2.26 billion in 1979 to $12.96 billion in 1990 and to $31.34 billion (EUR 35 billion) in 2001. With such industries as textiles and garments, iron and steel, and food-processing ranking among the leading contributors to this boom, the composition of exports began to change in favour of manufactured goods (Kotan and Sayan, 2002).

With the help of growing exports, manufacturing industry output began to expand and its composition changed in favour of increasingly sophisticated products. By the 1990s, "Metal products, machinery and equipment; transportation equipment (primarily automobiles); professional and scientific measurement and control devices" category had become the leading manufacturing sector (see table below).

Table C2. Value of Industrial Production by Sectors at Current Prices
(in millions of ECUs/Euros)

	Food, beverages & tobacco industry	Textiles, wearing apparel & leather industry	Wood & wood products (incl. furniture)	Paper & paper products; printing & publishing	Chemicals & chemical, petroleum, coal, rubber & plastic products	Non-metallic mineral products (except coal & petroleum)	Basic metal industry	Metal products, machinery & equip.; transport. equip.; professional & scientific measurem. & control devices	Other manuf. activities
1993	1,511	1,572	1,184	396	485	270	164	1,994	85
1994	1,041	1,184	692	176	308	145	186	1,095	55
1995	1,257	1,418	1,081	319	401	207	288	1,647	53
1996	1,292	965	1,027	290	354	175	324	1,814	51
1997	1,764	1,141	1,024	343	531	205	248	2,204	52
1998	2,015	1,149	1,169	379	598	215	252	2,275	66
1999	2,244	1,354	1,353	397	581	226	217	2,471	57
2000	2,513	1,386	1,540	495	750	268	291	3,202	73

Source: SIS Industrial Establishments Survey converted into ECUs/Euros
(http://www.die.gov.tr/IstTablolar/16im203t.xls)

In terms of the output growth, overall manufacturing output increased by about 48% between 1990 and 2002, despite visible reductions due to major economic crises in 1994, 1999 and 2001 (see the table below). It is interesting to note that while 1994 and 2001 crises caused reductions in the outputs of all manufacturing sub-sectors, two sub-sectors managed to have output growth during the 1999 crisis: In the case of "Office accounting and computing machinery", this growth was substantial, whereas in the case of "Radio, TV and communications equipment", it was modest.

Table C3. Industrial Production by Sectors
(Volume Indices by Sectors, 1997=100)

	Manufacturing industry	Machinery and equipment	Office accounting and computing machinery	Electrical machinery and apparatus	Radio, TV and communications equipment
1990	69.08	60.23	47.99	52.20	44.26
1991	70.37	59.08	67.69	55.16	61.45
1992	73.27	59.22	57.12	59.79	51.67
1993	79.76	73.50	54.39	66.67	50.51
1994	73.11	59.28	41.03	56.20	40.75
1995	83.05	71.64	45.36	75.74	43.07
1996	89.20	81.63	63.29	91.24	61.97
1997	100.06	100.08	100.21	100.07	100.21
1998	100.15	97.40	103.37	91.43	124.64
1999	95.91	86.65	287.55	86.28	134.28
2000	102.08	92.45	144.27	90.34	163.81
2001	92.42	73.52	54.46	75.59	149.01
2002	102.45	89.25	80.95	82.27	225.36

Source: Central Bank of Turkey, Electronic Data Delivery System (http://www.tcmb.gov.tr)

As for the value-added per employee in the manufacturing sector, there was a decline after 1993 and fluctuations between 1994 and 1999, but the productivity picked up in 2000 again as shown in the following table.

Table C4. Value Added per Employee
(in thousands of ECUs/Euros)

1993	1994	1995	1996	1997	1998	1999	2000
9.3	5.6	7.4	6.5	7.7	7.4	7.9	10.0

Source: State Institute of Statistics (http://www.die.gov.tr)

C.2. Main regions of industrial production

By most of the criteria that could be employed for this purpose, the most developed region in Turkey is Marmara Region, which encompasses Istanbul, the most populated province. The capital city Istanbul is the cultural, industrial and commercial capital of Turkey and is by far the largest metropolitan area in the country. Also containing major industrial centres like the cities of Bursa, Kocaeli and Sakarya, Marmara Region as a whole has the highest concentration of manufacturing industry and service establishments in Turkey. As such, Marmara Region has the highest regional share to the GDP, and is followed by Aegean Regıon (whose major city, Izmir, is the third largest in Turkey) and Central Anatolia with Ankara, the nation's capital and the second largest city in the country.

Table C5. Changes in the Contribution of Regions to Real GDP, 1983-1997

Region	1983	1997
Aegean	16.5	16.8
Black Sea	11.2	9.0
Central Anatolia	15.4	15.3
Eastern Anatolia	4.5	3.3
Marmara	37.1	38.2
Meditarrenean	11.4	12.1
Southeastern Anatolia	3.9	5.3

Source: Özötün, E. (1999). *Türkiye Gayri Safî Yurtiçi Hasılası* (*İller İtibariyle*), Ankara: SIS.
(http://www.dpt.gov.tr/bgyu/bg83-97.html#t4)

In terms of per capita income levels, Marmara Region is the leader and followed by Aegean and Central Anatolia Regions again (see tables below).

Table C6. Per Capita Real Income by Regions and Annual Growth Rates
(in millions of TL at 1987 prices and %)

Region	1983	1997	Growth Rate
Aegean	1476	2172	2.8
Black Sea	827	1271	3.1
Central Anatolia	1003	1616	3.5
Eastern Anatolia	517	683	2.0
Marmara	2038	2618	1.8
Meditarrenean	1138	1657	2.7
Southeastern Anatolia	565	952	3.8

Source: Özötün, E. (1999). *Türkiye Gayri Safi Yurtiçi Hasılası* (*İller İtibariyle*), Ankara: SIS.
(http://www.dpt.gov.tr/bgyu/bg83-97.html#t5)

Coming to the regional contributions to GDP by sectors, Marmara Region is again way ahead of others in industry and services, and is followed by the Aegean Region in industry, and Central Anatolia Region in services (see tables below).

Table C7. Contribution of Regions to Sectoral GDP, 1997 (%)

Region	Agriculture	Industry	Services	Overall GDP
Aegean	20.4	15.2	16.7	16.8
Black Sea	14.5	7.3	8.6	9.0
Central Anatolia	15.6	10.6	17.7	15.3
Eastern Anatolia	6.3	2.2	3.1	3.3
Marmara	13.6	51.8	36.9	38.1
Meditarrenean	18.0	8.7	12.5	12.1
Southeastern Anatolia	11.7	4.1	4.5	5.3

Source: State Planning Organisation, *Eighth Five Year Plan*.

Table C8. Output Growth Rates by Regions, 1987-1997 (% per year)

Region	Agriculture	Industry	Services	Regional GDP
Aegean	*1.2	**4.6	**5.2	4.3
Black Sea	*0.1	**4.4	**4.1	3.2
Central Anatolia	*-0.2	**6.1	**3.3	3.2
Eastern Anatolia	*0.7	**3.1	**2.1	1.9
Marmara	*-0.3	**6.3	*4.8	5.0
Meditarrenean	*2.5	*3.6	**5.3	4.3
Southeastern Anatolia	**5.3	**5.0	*3.6	4.4

Source: State Planning Organisation, *Eighth Five Year Plan*.
* Sectoral output in the region grows slower than regional GDP
** Sectoral output in the region grows faster than regional GDP

C.3. Declining and rising sectors of industry and services

The numbers in Table C8 reveal that agriculture is a declining sector in all regions either in the absolute sense (Central Anatolia and Marmara) or in the relative sense, except for Southeastern Anatolia. The strong growth of agriculture in this region is due mostly to the Southeastern Anatolia Project. Widely known as SAP or GAP in Turkish, the project aims to put more than 50 billion cubic meters of water carried annually by Euphrates and Tigris rivers into productive use primarily through the creation of new capacity for irrigation and hydropower generation. The SAP region covers the provinces of Batman, Diyarbakir, Gaziantep, Kilis, Mardin, Sanliurfa, Siirt and Sirnak, all in the relatively backward southeastern part of Turkey. Carried out under the coordination of State Hydraulic Works Authority (DSI), the project envisages the construction of 22 dams and 19 hydroelectric power plants on the Euphrates and Tigris rivers and their branches. As one of the most ambitious regional development projects ever launched in the world, however, the SAP goes beyond power generation and irrigation.

It also aims the development of necessary infrastructure for improvements in the existing communications and transportation networks and in the quality of health services, education, tourism etc., as well as for new residential and industrial development. As such it is more of an integrated regional development project than a simple investment to expand capacity for power generation and water use in agriculture. With an area of 75,358 square kilometres, it makes up 9.7 percent of Turkey's total land mass, and a considerable part of Turkey’s land stock suitable for irrigation lies in the SAP region encompassing vast plains in lower Euphrates and Tigris basins (Sayan and Demir, 2003).

Industry, on the other hand, is a growing sector in all regions, except for the Mediterranean Region where agriculture is also declining leaving services as the only growing sector. The strong growth of services in the Mediterranean Region is due to the popularity of the region as a centre of tourism. Tourism also contributes strongly to the growth of services in the Aegean Region.

Table C9. 3-Digit SITC Product Groups Covered
under "Technology Intensive Products" by Kotan and Sayan (2002)

522	Inorganic chemicals, oxides	751	Office machines
523	Other inorganic chemicals	752	Automatic data processing (ADP) equipment
531	Synthetic dye, nat. indigo, lakes n.e.s.	759	Office, ADP mach. parts, accessories
541	Medicinal, pharmaceutical products	761	Television receivers
562	Manufactured fertilizers	762	Radio broadcast receivers
582	Products of condensation etc.	763	Sound recorders, phonograph
583	Polymerization products etc.	764	Telecomm. equip., parts, accessories
591	Pesticides, disinfectants	771	Electric power machinery n.e.s.
711	Steam boilers and aux plant	772	Switch gear etc., parts n.e.s.
712	Steam engines, turbines	773	Electrical distributing equipment
713	Internal combustion piston engines	774	Electro-medical, X-ray equipment
714	Engines and motors n.e.s.	775	Household type equipment n.e.s.
716	Rotating electrical plant	776	Transistors, valves, etc.
718	Other power generating equipment	778	Electrical machinery n.e.s.
721	Agricultural machinery excluding tractors	792	Aircraft etc.
722	Tractors non-road	871	Optical instruments
723	Civil engineering equipment etc.	872	Medical instruments
724	Textiles, leather machinery	873	Meters and counters n.e.s.
725	Paper mill machinery etc.	874	Measuring, controlling instruments
726	Printing, book-binding machinery etc.	881	Photo apparatus, equipment n.e.s.
727	Food-machinery, non-domestic	882	Photo, cinema supplies
728	Other machinery for specialized industry	883	Developed cinema film
736	Metalworking machinery-tools	884	Optical goods n.e.s.
737	Metalworking machinery n.e.s.	885	Watches and clocks

The fluctuations in industrial production by sectors due to frequent economic crises in the 1990s and early 2000s mask the long-term tendencies of growth and decline in various sectors, making it difficult to determine winners and losers. Yet, looking at the 1990-2002 period based on data in Table c3, one could identify the "Radio, TV and communications equipment" sub-sector as a clear winner. With a 1990-2002 growth rate of about 409%, which picked up particularly after 1996, this sub-sector has performed much better than the manufacturing sector which had a growth of only 48% during the same period. With respective output growth rates of 69 and 58 percent "Office accounting and computing machinery" and "Electrical machinery and apparatus" are other winners within the manufacturing industry. These observations are supported by other studies as well. Formal empirical analysis in Kotan and Sayan (2002), for example, revealed that "Technology Intensive Products" were the broad category of manufacturing goods (see the table above) where Turkey performed remarkably well during the 1990s.

C.4. Changes in investment

The most significant characteristic of investment during the 1990s and early 2000s in Turkey is its volatility, reflecting the degree of economic instability in the country during this period. After a sharp drop from 15.9% in 1989-1990 to 0.4% in 1990-1991, the growth rate of investment picks up until the 1994 crisis. Following a recovery period again between 1995 and 1997, investment spending begins to contract in 1997-1998, and continues to dive except for 1999-2000.

Table C10. Current Value (millions of ECUs/Euros) and Growth Rate of Investment relative to the Previous Period (%)

Year	Value of Investment	Growth Rate
1990	26,955	15.9
1991	29,100	0.4
1992	28,972	6.4
1993	40,847	26.4
1994	26,750	-16.0
1995	31,810	9.1
1996	36,849	14.1
1997	45,296	14.8
1998	44,475	-3.9
1999	38,882	-15.7
2000	49,508	16.9
2001	31,110	-31.7

Source: State Planning Organisation (Data in Tables 1.12-1.13 at http://ekutup.dpt.gov.tr/ekonomi/gosterge/tr/1950-01/ converted to ECUs/Euros)

C.5. Specific sectors' market size and value (ICT industry)

The discussion in this section is organised along the following topics:

- Equipment and material production (electronics industry)
- Software production (software industry)
- Content production/supply (content industry)
- Communications infrastructure construction/operation (network operator)
- Internet service providers and hosts

C.5.1. Equipment and material production (Electronics industry)

Parallel to the growth in the diffusion of ICT, the informatics sector (electronic manufacturing, communication services and content) is rapidly growing. The volume of sales in the world has been projected to reach US$ 2,000 billion by 2010.

The Turkish electronics industry achieved a sales volume of US$ 1.6 billion (about 1.3 billion ECU's) in 1996. In terms of the production capability of the electronics industry, the total output for 1996 grew by 28%. The highest rate of growth was observed in telecom equipment with 51%, which was followed by the sub-components sector with an increase of 38%.

However, the total output significantly fell due to the 1994 economic crisis, and had been able to reach its 1993 level only by 1996 (MTC, 1999).

Based on the data available, the IT hardware market in the CC turned out to have a size of about 5 billion Euros in 2000, corresponding to less than 6% of the EU-15 market. More than 60% of this market was controlled by Poland and Turkey. Per capita IT expenditures in the Czech Republic and Slovenia were more than twice the CC average. The GDP shares of IT expenditures are higher in countries like the Czech Republic, Hungary and Slovenia, whereas they remain low in Bulgaria, Turkey and Romania, seemingly implying a positive correlation with income.

C.5.2. National Network Operator

Turkish Telecom (Turkish Telecommunications Co. Inc.) is a world-class operator in terms of line capacity, service variety and staff size. In terms of the distribution of its revenue and workforce, the conventional telephone service is its main line of service as it is typical all over the world. Prior to the leap forward in the use of digital technology when telecom services were still offered through the Post, Telephone and Telegraph Authority (PTT) of Turkey,[10] the basic task of Turkish Telecom was to try to expand the fixed-line telephone service accordingly, and Turkish Telecom became one of the most successful operators in the world in terms of raising teledensity across the country (MTC, 1999), earning itself a rank among the top 15 largest operators in the world in terms of the number of fixed-line subscribers served (Saygi, 2002).

In fact, there have been significant developments in the Turkish telecommunications sector with regard to the physical infrastructure and supply of services, particularly after the 1980s.[11] The telephone mainlines increased to 20.8 millions, and the telephone density rose from 3.5 percent in 1983 to 28 percent by the end of 2000 (SPO, 2001).

Yet, its success in the expansion of the basic telephone service has not been matched by its performance in other areas. The rapid change in telecommunications technology and services makes continuously updating the infrastructure and services necessary, requiring, in turn, continuous investment in the infrastructure, large amounts of R&D spending, and keeping the skill levels of staff up-to-date through continuous on-the-job training. Although the infrastructure has been considerably expanded through significant investment, the efficiency and investment per capita remained insufficient (Table 31), and Turkish Telecom could not keep up pace with the dynamics of the sector (MTC, 1999; SPO, 2001).

[10] Turkish Telecom was separated from the PTT and turned into an independent company in the 1980s, as part of a restructuring effort directed toward its privatization.

[11] By 1980, telephone line density had reached to only about 2.5 lines per 100 inhabitants. People were waiting for a long time (sometimes years in densely populated urban areas) to get a telephone line, as the number of lines was growing at the very modest rate of 50,000 lines a year. More than 72% of Turkey's 40,000 villages and rural settlements had no telephone service at all (Wolcott and Cagiltay, 2001).

Table C11. Economic/Financial Indicators for Telecom Services in Turkey 1999

Indicator	Value	
Total Revenue	US$ 4.8 billion	Euro 4.5 billion
Revenue per Capita*	US$ 74.3	Euro 70,0
Revenue/GDP**	3.1%	
Total Investment	US$ 575 million	Euro 540 million
Investment per Capita*	US$ 8.9	Euro 8.3
Investment /GDP*	1.2%	
Exports of Equipment	US$ 60 million	Euro 56 million
Imports of Equipment	US$ 1.8 billion	Euro 1.7 billion

Source: Reported by Saygi (2002) based on ITU figures.
***** Much lower than European and World averages
** Higher than European and World averages

Turkish Telecom has failed to fully satisfy user expectations, skilled manpower requirements and flexible structuring, slowing down the development of national information infrastructure, and improvements to services to be provided over the basic telecommunications network covering the ISDN, IN (intelligent network) and other services. This inadequacy has reached its peak in the provision of access to internet. Even though this is an area where all network operators in the world were caught more or less off guard, the adjustment in Turkey, in general, and of Turkish Telecom, in particular, has been relatively slower (MTC, 1999). As a result, the privatisation of incumbent operator and liberalisation of the market were reintroduced to the policy agenda in late 1990s, as discussed elsewhere in this report.

C.5.3. Software industry

Based on the findings of the MTC (1999) study, the capabilities and problems of the Turkish software sub-sector as of 1999 were as follows:

- Software houses were typically small enterprises in terms of capital, turnover and staff. 72% of the software houses had capitals of less than TL 1 billion (approximately US$5,000 at the current rate). At the start-up, these companies often seemed to prefer working with minimum capital. The average turnover of software houses in 1994 was US$819,000 (approximately 700,000 ECUs), and the average number of staff per software house was 21.
- Small software houses turned out not to use contemporary methodology and software development instruments extensively, produce accompanying documentation properly, carry out extensive product testing and debugging, and employ a well-defined marketing strategy, thereby failing to acquire an institutional character (MTC, 1999).

These problems lowered the efficiency of software houses and the quality of the software they produce, adversely affecting their prospects for growth and chances of competition with larger companies. Yet, the software industry in general had achieved certain capabilities, benefiting from the availability of a well-educated and energetic pool of computer and software engineers who typically receive a very high quality education at the universities they attend, as well as the well-developed creative skills of self-taught computer enthusiasts. So, the industry, in general, has the potential to boom and significantly contribute to the national information infrastructure with the proper guidance and support for the elimination of its current structural problems.

The recently enacted law allowing the establishment and operation of techno-parks and technological development zones with participation and leadership of universities is likely to give a boost to the sector. The small software houses with promising capabilities will now be able to complete their institutionalization and growth processes in the incubation centres of these techno-parks and technological development zones, by benefiting from significant tax and investment incentives provided by the government.

C.5.4. Content production industry

The national characteristics and qualities of a communication infrastructure are closely related to the national character of the content that flows through it. A communication network with minimal local content in the national language can hardly be considered truly national. Thus, an assessment of content capabilities requires that qualitative aspects such as uniqueness, diversity and accessibility be taken into account along side the quantitative aspects. However, such an assessment is beyond the scope of this report. In quantitative terms alone, the largest share in this market belongs to the Turkish printed media estimated to have produced an output worth US$ 900 million (approx. EUR 823 million) in 1998-1999 period. During the same period, music production and visual content were valued at US$ 537 million and US$ 386 million (about 480 and 350 million euros), respectively. The multimedia content produced, on the other hand, was estimated to worth only about US$ 14 million (about 12.5 million euros), excluding the advertising sector (MTC, 1999). It must be noted, however, that these numbers are very likely to be underestimated due to the presence of unrecorded transactions and illegal copying (as to be discussed later). This likelihood is further confirmed by the livelihood and dynamism of the Turkish media sector, and especially the broadcasting industry, which can be matched by only a few countries in the world. With more than 15 national TV networks and hundreds of local channels and thousands of radio stations that are free to watch and listen to, a cable TV network offering really affordable subscription rates, and conventional as well as digital Pay-TV channels serving on a subscription and/or pay-per-view basis, Turkish broadcasting industry has a wide audience not only within the national borders and neighbouring countries, but also reach audiences in such far away places as Albania, Egypt and Israel or Turkic republics of the former-Soviet Union in the Caucasus and Central Asia (see also Section E).

C.5.5. Internet service providers and hosts

Turkey was introduced to internet through a connection established with the USA on April 12, 1993 at a speed of 64Kbit/second. The initial work toward the strengthening of internet infrastructure was carried out by the Scientific and Technological Research Council of Turkey (TUBITAK) and Middle East Technical University (METU) until 1996, when a consortium formed by Sprint, Inc., Satko, Inc. and METU won the bid to create the national internet network, TURNET, on the basis of a revenue sharing agreement with Turkish Telecom. The composition of the consortium changed shortly afterwards as Satko and METU left and Sprint merged with other companies based in France and Germany. TURNET itself was later replaced by TTNET in 1998 (Gungor and Evren, 2002). As compared to some other countries, the overall growth of internet usership has not been particularly fast in Turkey –due in part due to a slow take off of infrastructure investment and to economic crises, but is expected to boom in the years ahead (see also Section B).

The number of internet hosts in Turkey reached 106 thousand by the end of 2001, representing an increase of about 35% as compared to 1999 (Gungor and Evren, 2002). When

the comparison is made over the three year period from July 1998 to July 2001, the growth in the number of internet hosts turns out to be about 105%, which fares lower than the average growth in both the CC and EU areas. Considering only the country code top level domains, the number of Internet hosts increased in the CC area by 188% and by 125% in the EU area during the same period. Although the liberalisation of communication services in the CC boosted the Internet, the difference that remains between the Internet host densities in the EU members and the CC is still large. There are also marked differences among the CC themselves. Turkey, Romania and Bulgaria, for example, have low densities, whereas Estonia has an Internet host density close to the EU average.

As for the number of Internet service providers (ISP), the number stood at 88 as of 2002 with the respective market shares in terms of the number of subscribers reported below. Even though the numbers in Table C12 seems to indicate a heavy concentration of market shares held by the top 4 ISP's, this may not be an immediate cause for alarm about the monopolistic domination of the market as :

i) the relatively close shares of the top 4 ISP's would prevent monopolistic or duopolistic domination, and

ii) even if the numbers seem to indicate an oligopolistic market structure, the market share in terms of the number of subscribers is not the only indicator to determine market power in the sense of the capability to set subscription rates.

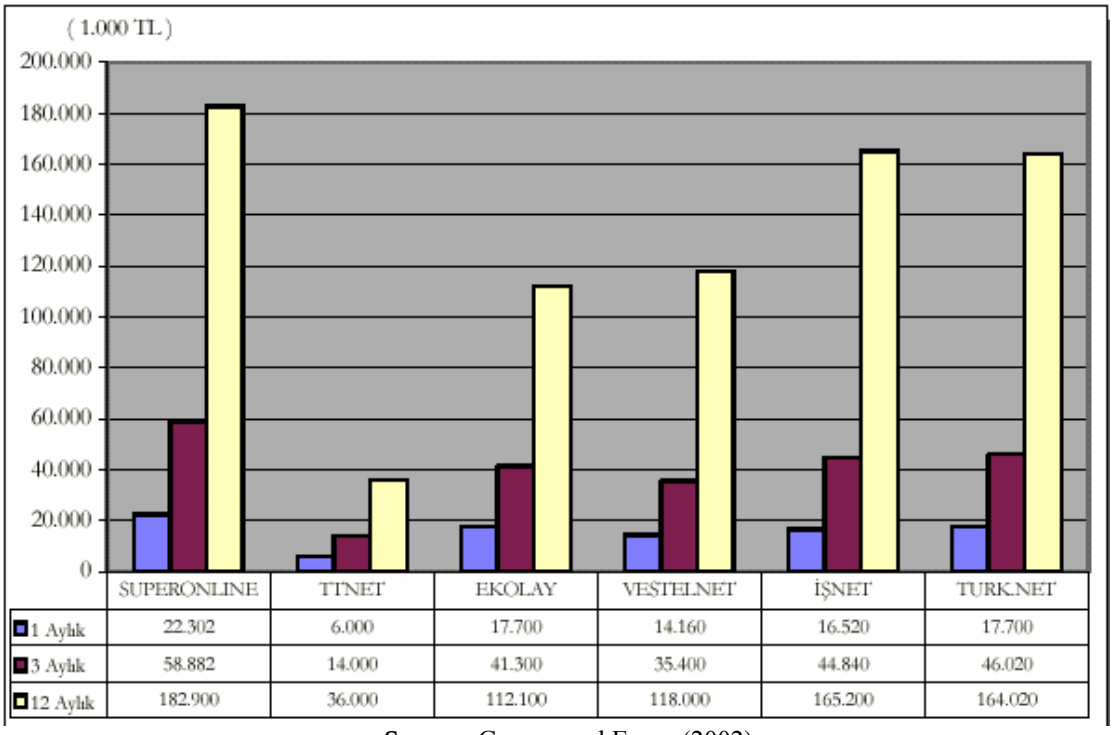
Table C12. Market Shares of ISP's by Regions in Turkey 2002

Regions	**Number of ISP's**
Superonline	26
TTNET	25
E-Kolay	19
Vestel Net	16
Total for Top 4 ISP's	86
Is Net	4
Turk Net	3
Others	7
Overall Total	100

Source: Gungor and Evren (2002).

The average subscription rates charged by the top 6 ISP's in 2002 are given in the chart below, where yellow, scarlet and blue bars show annual, 6-monthly, and quarterly rates in thousands of Turkish Liras, respectively. (1 EUR = 1 733 874 TRL, 2002)

Graph C1. Subscription Rates by Top ISP's in Turkey 2002



	SUPERONLINE	TTNET	EKOLAY	VESTELNET	İŞNET	TURK.NET
1 Aylık	22.302	6.000	17.700	14.160	16.520	17.700
3 Aylık	58.882	14.000	41.300	35.400	44.840	46.020
12 Aylık	182.900	36.000	112.100	118.000	165.200	164.020

Source: Gungor and Evren (2002).

Based on 49 ISP's responses to a questionnaire, the geographical distribution of the ISP's were as follows, indicating a heavy concentration in Istanbul (Marmara Region).

Table C13. Distribution of ISP's by Regions in Turkey 2002

Regions	Number of ISP's
Aegean Region (Izmir)	3
Central Anatolia	12
Ankara	9
Eskisehir	1
Konya	2
Marmara Region (Istanbul)	34
Turkey	49

Source: Gungor and Evren (2002).

C.6. International co-operation and competition

In a recent paper, Kotan and Sayan (2002) considered the nature of competition between Turkish and East Asian (EA)[12] exporters of selected manufacturing products –including the technology intensive commodities– in the EU market, and empirically investigated the effectiveness of price competition in helping Turkish exporters maintain/increase their market

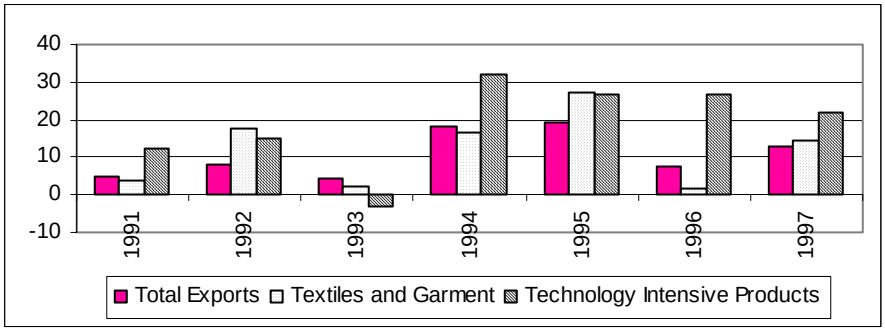
[12] People's Republic of China, Hong Kong, South Korea and Taiwan.

share. The focus was on competition against EA exporters, as they stood out as particularly strong competitors of Turkish products –often cited by Turkish Exporters' Association as the main competitors in the EU market during the 1990s.

The analysis concentrated on two commodity groups: "Textiles and Garments" that have traditionally been a major export category for Turkey, and "Technology Intensive Products" including the ICT products that make up an up-and-coming export category –and has recently become even more important (see Table c10 above for the commodity coverage of these sectors). Consideration of these two categories would be interesting as the relative significance of textiles and garment exports for Turkey declined, whereas that of technology intensive exports increased during the 1990s (see Lohrmann, 2000 and the figure below).

Furthermore, exports of technology intensive commodities are known to significantly contribute to growth and to have a potentially important role in improving a country's overall competitiveness in international markets. These are highly tradable goods with an increasing share not only in the world trade but also in total exports of Turkey and the EA countries over the recent years. Lohrmann (2000) shows that Turkey also managed to increase its share in the world markets for this product category during the 1990s.

Graph C2. Growth Rates of Turkish Exports by Sectors: 1991-1997



Source: OECD International Trade Statistics CD-ROM.

The estimation results in Kotan and Sayan (2002) suggest that relative price movements are an important factor affecting the relative shares of Turkey and EAs in the EU market for both product groups considered, but especially for technology intensive products. More precisely, an increase in the price charged by exporters from a particular country over prices charged by others will lead to a decline in that country's share in the EU imports. Furthermore, the EU's import demand for both product groups turned out to be elastic, implying that the exporters of these products would not be able to enjoy high margins between prices and costs. This further implies that the exporters who want to make a headway against the competition should try to charge lower prices by reducing their costs.

Within this framework, Turkish exporters were noted to have two potential advantages over their SEA competitors in the EU market. The first one is the geographical proximity of Turkey to the EU, which was presumed to enable Turkish exporters to charge lower prices by reducing the transportation costs. Yet, a further investigation of this issue led to a striking finding –which, we believe, is new to this study– revealing that the geographical proximity did not equally apply to the two product groups that we considered. While Turkey's proximity advantage was clearly strong in the case of textiles and garments, it was hardly visible in the case of technology intensive products. This asymmetry was due to the economies of scale

provided to the EA producers of technology intensive products through the large volumes of their shipments to the EU.

The second advantage of Turkish exporters was thought to come from the special nature of the relationship between Turkey and the EU, which led to a gradual abolishment of the customs duties on Turkish manufacturing exports to the EU on the way to the CU agreement signed between the two parties, to be followed by Turkey's full membership in the EU. In fact, custom duties were bilaterally decreased to very low levels and abolished totally for certain products long before the 1996 CU agreement (DPT, 1995). However, the data restrictions did not allow for the effects of the preferential customs duties on Turkey's price competitiveness to be explored in detail.

In summary, the results in Kotan and Sayan (2002) revealed that any cost reducing effects that geographic proximity and custom advantages might inflict upon the competitiveness of Turkish manufacturing exports would be limited. The geographic proximity of Turkey to the EU markets is likely to provide some cost advantage by reducing freight costs, but such an advantage would not generally be large in the case of technology intensive products whose markets grow increasingly faster than the others, unless Turkish exporters could arrange larger shipments. There is confirming evidence, that Turkish exporters have now increased the volume of shipments in some ICT products such as TVs and have been reaching increasingly larger shares in the EU market. Thanks to continuous R&D activity and product innovation, the Turkish company Vestel, for example, increased its sales of colour TVs by 1000% between 1994 and 1998, and raised its market share from less than 1% to 13% in the highly competitive European television market as discussed in greater detail in Section D.

C.7. Regional cross country agreements

In addition to its membership in such organisations and groups as the UN, IMF, World Bank, NATO, Organisation for Security and Cooperation in Europe (OSCE), Council of Europe, Organisation of Islamic Conference, D8 and G20, Turkey is the founder of Black Sea Economic Cooperation Organisation (BSEC) which aims to serve to maintenance of regional peace and stability through economic cooperation among Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Greece, Moldova, Romania, Russia, Turkey and Ukraine. Founded on 25 June 1992 through the signing of Istanbul Summit Declaration by the heads of state or government of member countries, BSEC has set up a regional structure for multilateral cooperation in various fields of economic activity (see Sayan, 2002 and Sayan, 1998 for more information on BSEC).

Turkey is also a founding member of Economic Cooperation Organization (ECO) which is an intergovernmental regional organisation established in 1985 by Iran, Pakistan and Turkey for the purpose of economic, technical and cultural cooperation among member states. The objectives of the Organisation, stipulated in the Treaty of Izmir, include expansion of mutual trade and promotion of conditions for sustained economic growth in the region. ECO is the successor organisation of regional Cooperation for Development (RCD) which remained in existence from 1964 to 1979. Subsequently the Organisation was restructured and reviewed under its present name ECO in 1985. In order to provide a proper legal basis to ECO. the basic document of the Organisation, Treaty of Izmir of 1977, was amended at a ministerial level meeting held at Islamabad in June 1990. The amended Treaty of Izmir was subsequently ratified by the founding members with the Organisation becoming fully operational in its new form by early 1991. In 1992, ECO admitted seven new members. Its present membership of

ten includes Afghanistan, Azerbaijan, Iran, Kazakhstan, Kirghizistan, Pakistan, Tadjikistan, Turkey, Turkmenistan and Uzbekistan.

C.8. Major sectors of innovation activity

Since innovation capacities of the firms in the electronics sector was important for competitiveness, their capabilities were considered also from the viewpoint of creating new products in the MTC (1999) study, and the following conclusions were reached:

- It was noted that new products were created in the consumer electronics sub-sector. The share of young products in the turnover was 38.6% for SMEs and 34.2% for large-size enterprises over the period from 1993 to 1996.
- Project planning and monitoring was performed more effectively in larger firms. Effective project planning was less common in SME's.
- It was observed that large firms attributed greater importance to quality work in comparison to small- and medium-sized enterprises. All large electronics firms had an ISO 9001 certificate, whereas only 45% of the SME's had an ISO 9001 certificate. All large firms implemented the total quality management concept.
- All large firms in both mechanical and electronic areas used computer-aided design.

In summary, the innovative capacity, technical skills and capabilities were undoubtedly better in large firms than in the SME's. As noted in Section d31, however, some small companies have begun to challenge the large companies in innovation contests in recent years, despite smaller amounts of funds they spend on R&D activities.

C.9. Trade balance of ICT industry

In 1995, the value of electronic imports and exports by Turkey stood at US$ 2.2 billion (about 1.7 billion ECU's) and US$ 502 million (close to 400 million ECU's), respectively. In terms of the distribution of imports by origin and exports by destination, roughly half of both imports and exports were with the European Union members. In terms of the commodity composition, imports concentrated on components and computer equipment, while exports concentrated on consumer electronics and telecommunications equipment (MTC, 1999).

The volume of trade in ICT equipment continuously increased thereafter until 2001 when the economic crisis again caused sharp reductions in imports. The export and import values for selected ICT products are given in Table C14, where the values are reported by 3-digit Standard International Trade Classification (SITC) Codes.

Table C14. Trade in ITC Products (millions of dollars)

SITC, Rev.3 Category	1997	1998	1999	2000	2001
ITC Exports					
75 Office machines and automatic data processing	28.8	42.6	60.0	63.1	52.4
76 Telecommunications and sound recording and reproducing apparatus and equipment	458.6	846.2	753.0	944.5	987.3
77 Electrical machinery, apparatus and appliances, n.e.s. and electrical parts thereof	1,007.1	1,050.6	1,017.7	1,163.0	1,426.1
ITC Imports					
75 Office machines and automatic data processing	913.1	1,061.6	1,206.9	1,594.7	781.1
76 Telecommunications and sound recording and reproducing apparatus and equipment	1,162,0	1,556.2	2,348.6	3,009.8	1,206.1
77 Electrical machinery, apparatus and appliances, n.e.s. and electrical parts thereof	2,563.5	2,795.6	2,553.0	2,898.8	2,142,5

Source: SIS.

C.10. Major actors of ICT industry, role and presence of multinationals and/or foreign companies

Table C15 presents information about ICT companies that were listed in 2001's 500 Major Industrial Enterprises rankings (by net sales) that Istanbul Chamber of Industry (ICI) traditionally prepares every year (http://www.iso.org.tr/ inghtml/ingsiteindex.html). In addition to each company's rank, the table gives its activity areas, net sales in 2001 and ownership structure using the following abbreviations:

D : Domestically owned;

J : Joint venture;

Pr: Private;

Pu: Public

Table C.15. ICT Companies within the Top 500 by Net Sales (2001)

Company	Rank	Activity Areas	Net Sales (in EUR million)	Ownership Structure
ARCELIK	5	Consumer electronics including ICT equipment and home appliances	865.15	D/Pr
VESTEL ELEKTRONIK	9	Consumer electronics including ICT equipment and home appliances	773.30	D/Pr
BEKO ELEKTRONIK	17	Consumer electronics including ICT equipment and home appliances	369.42	D/Pr
BOSCH	27	Consumer electronics including ICT equipment and home appliances	275.32	J/Pr
SIEMENS	29	Consumer electronics including ICT equipment and home appliances, Software and ICT services	259.19	J/Pr
ASELSAN ELEKTRONIK	35	Defence related electronic communication equipment and systems	233.18	D/Pu
PROFİLO TELRA ELEKTRONİK	38	Consumer electronics including ICT equipment and home appliances	211.72	D/Pr
ALCATEL TELETAŞ TELEKOMÜNİKASYON ENDÜSTRİ	42	Telecommunications equipment, infrastructure and services	197.98	J/Pr
VESTEL KOMÜNİKASYON	75	Telecommunications equipment and services	141.38	D/Pr
HES HACILAR ELEKTRİK	101	Telecommunications cables and wiring	115.26	D/Pr
HESFİBEL FİBER OPTİK VE ELEKTRONİK	217	Telecommunications cables and wiring, fibre-optic cable production and installation; Electronic	57.32	D/Pr
HAVELSAN HAVA ELEKTRONİK	366	Avionics systems, Information systems and technologies, Electronic warfare and simulation systems and technologies, Defence and security systems	35.19	D/Pu
TURK TELEKOM ISTANBUL PLANT	440	Telecommunications equipment and infrastructure	29.15	D/Pu

(http://www.iso.org.tr/_inghtml/ingsiteindex.html).

The next two tables give figures measuring the contribution of ICT firms to the exports of Turkey, and employment using the Top 10 firm rankings of ICI.

Table C.16. ICT Companies within the Top 10 Exporters (2002)

Company	Rank	Activity Areas	Value of Exports (in Millions of USD)	Ownership Structure
VESTEL ELEKTRONIK	1	Consumer electronics including ICT equipment and home appliances	783.81	D/Pr
BEKO ELEKTRONIK	5	Consumer electronics including ICT equipment and home appliances	448.25	D/Pr
BOSCH	9	Consumer electronics including ICT equipment and home appliances	311.70	J/Pr

Table C.17. ICT Companies within the Top 10 Employers (2002)

Company	Rank	Activity Areas	Number of Employees in 2002 (in Millions of USD)	Ownership Structure
ARCELIK	9	Consumer electronics including ICT equipment and home appliances	6,275	D/Pr

The following table shows the contribution of multinational or foreign companies to investment in related sectors.

Table C.18. Foreign Investment in ICT Related Sectors, June 2003

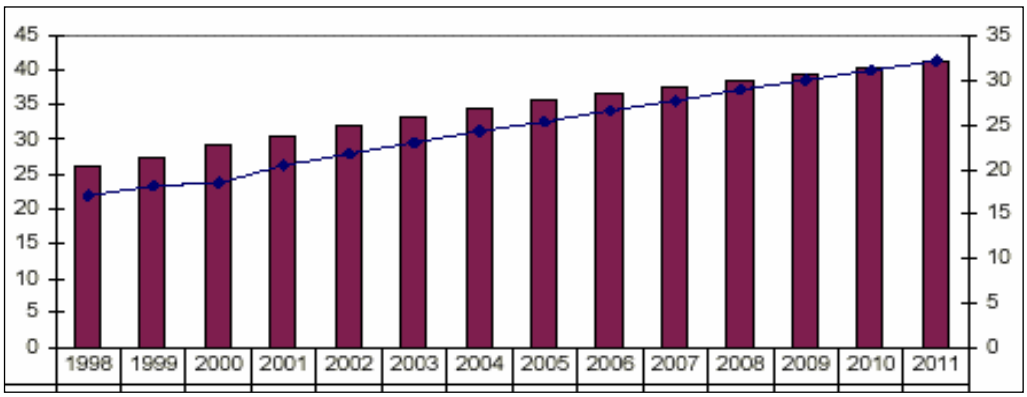
Sector	Share of Sectoral Foreign Capital in Total Foreign Capital Invested in Turkey (%)	Share of Foreign Capital in Total Capital Invested In the Sector (%)
Electrical Machinery	2.42	82.00
Electronics	1.82	56.94

Source: Turkish Treasury (http://www.hazine.gov.tr/stat/yabser/ybsyeniturk.htm)

C.11. Past and future of ICT industry

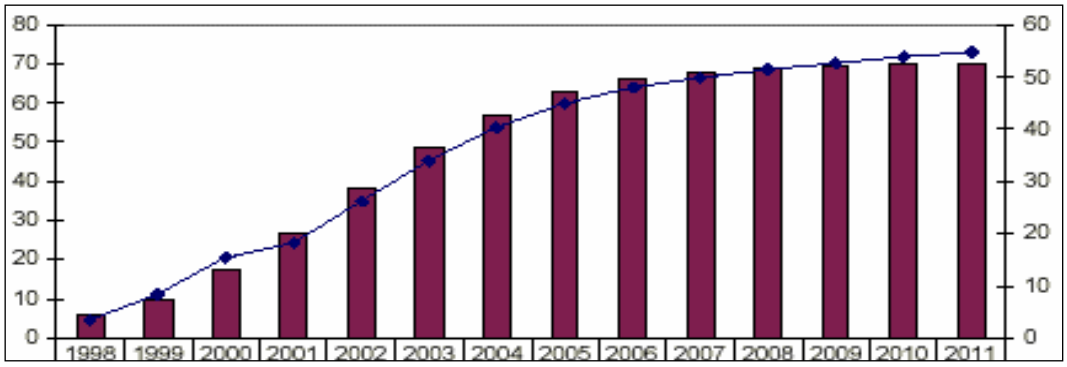
This section presents forecast results concerning the ICT in Turkey in the next decade or so. All results reported in Figures C.3.-C.5. and Table C.19. are taken from Saygi (2002).

Figure C.3. **:**Forecasted Number of Fixed Lines and Density: 1998-2001



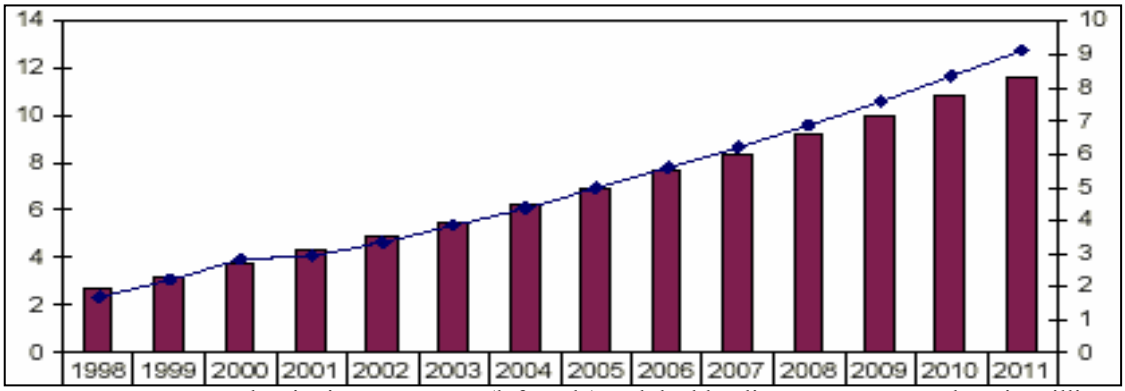
Note: Bars represent density in percentages (left scale) and the blue line represents numbers in millions (right scale)

Figure C.4.: Forecasted Number of Cell Phones and Density



Note: Bars represent density in percentages (left scale) and the blue line represents numbers in millions (right scale)

Figure C.5.: Forecasted Number of Personal Computers and Density



Note: Bars represent density in percentages (left scale) and the blue line represents numbers in millions (right scale)

Table C.19. ICT Forecasts

Year	Fixed-Lines		Mobile Phones		PCs		Internet Users	
	Number (millions)	**Density** (%)	**Number** (millions)	**Density** (%)	**Number** (millions)	**Density** (%)	**Number** (millions)	**Density** (%)
1998	17.07	26.03	3.53	5.56	1.71	2.76	0.45	1.16
1999	18.18	27.57	8.18	10.00	2.21	3.23	1.51	1.98
2000	18.56	29.06	15.25	17.04	2.80	3.75	2.53	3.06
2001	20.51	30.48	18.05	26.82	2.90	4.31	2.93	4.35
2002	21.75	31.84	26.07	38.16	3.36	4.91	3.96	5.80
2003	22.98	33.13	33.89	48.88	3.85	5.55	5.07	7.32
2004	24.19	34.36	40.26	57.19	4.38	6.23	6.22	8.84
2005	25.38	35.51	44.83	62.72	4.98	6.93	7.36	10.30
2006	26.55	36.60	47.90	66.03	5.56	7.67	8.47	11.67
2007	27.71	37.62	50.00	67.89	6.21	8.43	9.51	12.91
2008	28.84	38.58	51.50	68.89	6.89	9.21	10.48	14.02
2009	29.95	39.47	52.69	69.42	7.60	10.01	11.37	14.99
2010	31.05	40.30	53.70	69.70	8.34	10.82	12.19	15.82
2011	32.12	41.07	54.62	69.84	9.11	11.65	12.93	16.53

Source: Saygi (2002).

C.12. SWOT Analysis

Strengths	**Weaknesses**
• Solid and growing industrial basis • Important sectors such as Food, beverage and tobacco; Wood industry • Growing role of Technology intensive production • Important role of Consumer Electronics industry • Internationally competitive fields of electronics industry • Strong tendency towards increased density of ICT products • FDI in ICT industries	• Uncertainty environment not conducive to domestic investment and FDI due to political and macroeconomic instability • Budget deficit and government borrowing-induced high interest rates crowding out private investment • Regional differences in the levels of development • Slow service developments
Opportunities	**Threats**
• Increasing political and economic stability • Economic growth rate picking up • Increasing competition • FDI flows • EU markets • TT privatisation	• Prolonged recovery from economic crisis • Political instability • Further restructuring of agriculture, generating more unemployment

Among the strengths cited here, the most important for further development of ICT would be most likely the growing production and exports of technology intensive products, particularly consumer electronics industry. Generally high degree of competition within the Turkish electronics industry will help international competitiveness of these products to increase continuously. Despite the rather low level of overall FDI inflow into the country, the concentration of FDI in ICT firms is certainly helpful. As for the weaknesses, the single most important weakness of

Turkey is once again political and economic instability lowering both domestic and foreign investment in every sector including the ICT industries, below what would have otherwise been expected. Fortunately, however, there are signs that the stability is getting restored.

D. PRESENCE OF MOST RELEVANT ECONOMIC ACTIVITIES FOR IST APPLICATIONS

D.1. The most relevant potential spill-over effects of IST

IST have a strongly positive impact on the economic growth, and they heavily affect and change daily practices of the society and the way business is conducted in all economic sectors. The impact of these technologies on the sectors which adopt them is not limited to an increase in production efficiency, with their adoption affecting the relations that companies and organisations with others often in such a way to create positive externalities.

IST technologies promote economic growth and facilitate the creation of new employment as they:

1) help improve human resource potential of the economy, and increase labour productivity in the medium- to long-run
2) make it possible to get more work done in any given time interval in many sectors by shortening the period needed to access and process information, and reducing the associated costs even in the short-run:
3) generate additional business for companies that are users of IST
    i) through creation/expansion of demand for new or existing goods and services by creating or raising the awareness about their availability (B2C or B2B e-trade)
    ii) through the rise in the number of transactions that can be completed in a given period –resulting from the increased number of deals that can be made and/or the speeding up of the delivery/payment processes (B2C or B2B e-trade, banking sector)[13]
4) provide the most important inputs in certain industries such as engineering industries and the production of technology intensive products
5) generate additional business for companies producing/selling ICT equipment and supplies and for companies that offer technical support and infrastructure:

    In addition to numerous software houses and companies, there are many businesses that sell imported or domestically produced desk-top PCs (such as Escort Computer which also exports its own computers and computer accessories), notebooks (such as Casper), internet TVs (such as Vestel which is the developer of an internet TV technology and one of the largest producers in the world). Likewise, networking has become a business creating jobs for employees of many companies that are in the business of creating intranets, LANs etc. In addition, optic cable production became a serious business. Hesfibel, for example, is one of the largest telecom cable exporters in Turkey (USD 37 million in 2001), and provides its domestic and international customers with services ranging from cable route survey, network design, and fibre and copper cable production, installation, training, commissioning to underwater cable production, laying and jointing. With an optical fibre production capacity of one million kilometres a year, the company employing 400 people produces more than 30 000 kilometres of fibre-optic cable a

[13] Almost all businesses experience the substantial reduction in transaction times and increased confidence in these transactions thanks to the electronic payment revolution that Turkish banking system went through. The legislation of e-signature bill is expected to further boost the volume of transactions (see Section e13).

year, and has a turnover of more than USD 50 million (http://www.hesfibel.com/about.html).

6) create a constant pressure for innovation, requiring significant resources be devoted to R&D activities which often generate side benefits in the form of new products or processes:
7) help reduce corruption and hence, waste of resources:
8) another benefit of IST is the increased transparency in such areas government procurement which, in turn, helps reduce corruption[14].
9) in addition, IST often improve the quality and accuracy of and/or speed of access to weather forecast information thereby leading to more effective production planning in such sectors as agriculture and fisheries, and to an improved capacity of the economy to cope with disasters, hence helping save human and physical capital. The satellite developed by TUBITAK-Bilten, for example, is expected to serve to these purposes (see Section B).
10) last but not least, IST have (and will continue to) contributed to reductions in employee absenteeism for they enable employees to take care of their personal businesses (like paying taxes, banking needs) without leaving the workplace. Especially considering the amount of time that the traditional tax payments and passport applications etc. take, this is a significant benefit indeed.

Concerning items 3 and 5 above, total and per capita ICT expenditures in Turkey have increased respectively by about 235% and 221% in nominal US dollar terms, whereas the share of ICT expenditures in GDP has had a 2.25-fold increase between 1995 and 2001 by the figures released by the World Bank Development Data Group (see the table below).

Table D1. ICT Expenditures in Turkey

	1995	**2001**
Total ICT Expenditures ($, million)	2,777.0	9,313.0
ICT Expenditures as % of GDP	1.6	3.6
ICT Expenditures per capita ($)	44.4	142.7

Source: World Bank Development Data Group.

D.2. ICT investments

The 8th Five Year Plan covering the period from 2001 to 2005 assigned a high priority to any investment which will lead to an increase in the economy's information production and dissemination capacity in line with the aim of transition to information society. Accordingly, the Plan envisaged the use of incentive policies for promotion of domestic investment and for encouraging foreign investment to be directed mainly to ensure further integration of the Turkish economy with the world, and to facilitate transition to the information society. Within this context, the need to support investment and activities towards:

[14] In Turkey, government has traditionally been the largest purchaser of many products and services. While one form of corruption in government procurement involved limited dissemination of information about tenders and bids in the past, the announcement of all relevant information through the web sites of government agencies curbed this tendency.

- development of information technologies (including software and technology development projects and R&D activities);
- protection of environment;
- improvement of productive capacities of small and medium size enterprises,
- improvement of human resources potential of the country, and
- reducing regional disparities

were emphasised by the Plan, along with more traditional priorities set to support investment and productive activities in areas which will lead to an increase in foreign exchange receipts and in total employment.[15]

Yet, the effectiveness of any incentives that have or will be provided to the type of projects mentioned in the Plan will be difficult to measure with precision since sectoral investment figures are the type of data that is most difficult to find anywhere in the world, except for very broadly defined sectors, and Turkey is no exception in this area. The lack of a standard definition as to the coverage of ICT makes it even more difficult to collect information on total ICT investment, let alone using a industry, services and public administration division. Still, the ranking of the share of loans to the communications sector is an indicator of the strength of economic activity in this area: As of July 2001, the loans extended to the communications sector stood at about EUR 20.1 million (TL 2 316 trillion), corresponding to a share of 5.3% in total. This represents the fourth largest share in the credit market following textile products, wholesale-retail trade and construction sectors (Tuzun and Sezer, 2002).

The 8th Five Year Plan projects that the sector (together with transportation) will be among the leading sectors with strong investment growth over the 2000-2005 period. With a 9.1% annual growth rate expected for this period, fixed capital investment in the transportation and communications sector will follow education (16.9%), tourism (12.7%), energy (12.1%) and health (9.8%) sectors (Table D2 below). Furthermore, it is interesting to note that in terms of the significance of the share of private sector in the composition of this average growth, transportation and communications is second only to tourism.

Table D2. Fixed Capital Investment by Sector

	2000 (At 1998 Prices Trillion TL.)			2000-2005 Annual Average Change (%)			2001-2005 Period Sectoral Distribution (Current Prices, %)		
	Public	Private	Total	Public	Private	Total	Public	Private	Total
Agriculture	179,1	275,7	454,8	11,5	5,8	8,2	5,3	3,2	3,9
Mining	41,1	99,1	140,2	0,2	-9,4	-6,2	1,1	0,8	0,9
Manufacturing	143,1	1504,1	1647,2	-19,8	10,2	8,7	1,8	20,4	14,3
Energy	542,1	187,6	729,6	10,5	16,4	12,1	18,0	2,9	7,8
Transportations-Communication	791,0	1138,8	1929,8	5,6	11,2	9,1	20,3	16,7	17,9
Tourism	12,2	417,9	430,1	2,3	12,9	12,7	0,2	6,8	4,6
Housing	29,4	3838,5	3867,8	-35,8	2,9	2,8	0,1	42,5	28,8
Education	422,7	122,8	545,5	14,6	23,5	16,9	15,0	2,6	6,6
Health	132,2	211,5	343,7	11,0	9,1	9,8	5,4	2,9	3,7
Other Services	370,9	344,8	715,7	10,2	-27,1	-1,2	6,5	1,3	3,0
Investment Workmanship	310,0	-	310,0	5,3	-	5,3	5,2	-	1,7
Local Administrations	877,0	-	877,0	5,3	-	5,3	21,0	-	6,8
Total	3850,8	8140,8	11991,5	7,5	6,5	6,8	100,0	100,0	100,0

Given that the public investment going to communications component of this sector is mostly made up of investment made by Turkish Telecom, the relative share of private sector in total investment growth could further increase if Turkish Telecom could be privatised before 2005,

[15] The text of 8th Plan can be found at http://ekutup.dpt.gov.tr/plan/viii/plan8i.pdf

both because of the change in the definition of private and public actors and the expected acceleration in investment under private ownership. Such an acceleration is likely indeed since the publicly owned Turkish Telecom has already begun to fall behind the European and World averages in investment (Table D3 below).

Table D3. Economic/Financial Indicators for Telecom Services in Turkey 1999

Indicator	**Value**	
Total Investment	US$ 575 million	EUR 540 million
Investment per Capita*	US$ 8.9	EUR 8.3
Investment /GDP*	1.2%	

Source: Reported by Saygi (2002) based on ITU figures.

D.3. Trends in innovation[16]

It can be argued that Turkey entered the Science and Technology Policy (STP) era with the establishment of The Scientific and Technical Research Council of Turkey (TUBITAK) in 1963 (see Section b35.2), when economic planning period had just started. The naive period (science-push) of the Turkish STP lasted from the early 1960's to the late 1980's, during which Turkey followed the main trends of the developed industrial economies but showing a time lag of about 20 years. With the sweeping economic reforms of the early 1980's, the economic policies in Turkey radically changed before the change in the STP.

TUBITAK was established for the purpose of initiating, coordinating and promoting basic and applied research. For about ten years at the beginning, its main function was limited to supporting basic research at the universities through its grants which were limited to very modest sums, not comparable to amounts in countries with advanced R&D systems. Nevertheless, these activities represented small steps towards creation of a modern research infrastructure and a research-base for the future. Over the years, parallel to the developments in the economy, the mandate of TUBITAK has gradually evolved from supporting basic research towards industrial technological activities, and contract research, via two Amendments in its Founding Act in the late 1980's, and early 1990's. An (earlier) important development in this direction was the establishment of Marmara Research Center (MRC) in Gebze, (at Marmara region near Istanbul, where the majority of Turkish industry is located) in 1972.

In the early phase, the main national STP targets were formulated by TUBITAK without any official STP document, through a tacit consensus with the government. In this phase the targets were to broaden R&D infrastructure by training researchers and establishing public R&D facilities, and to create a research medium and tradition by encouraging, supporting and carrying out research activities almost exclusively in the academic sector to catch up with the critical values of the R&D indicators. Turkish S&T system was regulated by a supply-oriented STP (science-push approach) for a relatively long span of time. Obviously, in this period the government was the main actor, and its principal agent was TUBITAK.

The first science and technology policy document, *Turkish Science Policy: 1983-2003,* was prepared in 1983 and explicitly recognised the role of technology for development, and

[16] This section relies mostly on Guruz and Pak (2003).

suggested priority areas of technology. Although these technology areas were broadly defined, this document should be regarded as the first attempt towards defining "critical technologies" in Turkey. This document led to the creation of the Supreme Council for Science and Technology (SCST) in 1983 as the highest policy-making body responsible for formulating national science and technology policies with the participation of related ministers, high level bureaucrats, technocrats and representatives of related NGOs. Only in the early 1990s, the Supreme Council started to play an active role in formulating the national STP as the central element of national information system.

The second STP document, Turkish Science and Technology Policy: 1993-2003, was approved in February 1993. With its emphasis on the paradigm shift from "building a modern R&D infrastructure" to "innovation oriented national policies", the publication of this document represented a turning point in the STP in Turkey. Moreover, the policy formulated in this document was elaborated and formed the basis of the science and technology chapter of the Seventh Five Year Economic Development Plan covering 1996-2000.

To summarise, over the past two decades, there have been significant developments in the Turkish science and technology policies:

- Turkey rose to the upper echelons of (intermediate) technology producing countries, after a long period of manufacturing under license. The signing of the Customs Union Agreement with the EU in 1996 helped to further improve the competitive environment, which is a prerequisite for an innovative economy.
- The R&D policy ceased to be perceived as synonymous with the S&T policy as in the 1960's and the 1970's, and a new approach emerged in 1990's shifting the emphasis to innovation-oriented or innovation-supporting national policies.
- As a reaction to the changing nature of innovations, the hierarchical transfer of tasks between actors on the S&T stage has left its place to a new, horizontal cooperation between such sub-systems as the universities, public sector research facilities and industry.

A brief history of the emergence within the last decade of the new institutional framework behind R&D expenditures is summarised below:

- Establishment of Small and Medium Industry Development Organisation (KOSGEB), 1990 (see Section b35.5)
- Industrial R&D Support Programmes (see Section b35.2 and b35.4)
- R&D loans (TTGV), launched in 1992
- R&D grants (TUBITAK), launched in 1995
- National Research Network (TUBITAK), 1996
- University-Industry Joint Research Centres (TUBITAK), 1996
- National Metrology Institute (TUBITAK), 1992
- Restructuring of Turkish Patent Institute, 1994
- Industrial Intellectual Property Legislation Reform, 1994-1995
- Accreditation Board, 1999
- Technology Development Regions Act, 2001

D.3.1. R&D expenditures

Concerning the R&D system, the areas where Turkey is particularly behind are the finances and manpower inputs provided to the national R&D system (see table D4 below).

Table D.4. Comparative R&D indicators

Country or Group	R&D Exp. as % of GDP	R&D Exp. in Bus. Sector % of Total	R&D Performed by Bus. Sector of Total	R&D Exp. in Gov. Sector % of Total	R&D Performed by Uni. Sector of Total	Sci. and Eng. in R&D per 1000 Employee	Trt. Stud. In Sci. Math. And Eng % of Total Tert.	Number of Publications 2002		
	1991-2001	**1991-2001**	**1991-2001**	**1991-2001**	**1991-2001**	**1991-2001**	**2001**	**1981**	**1995**	**2002**
Finland	3.37	70.30	70.90	26.20	17.8	15.2	27.7	2 615	5 732	8 004
USA	2.82	68.30	74.40	26.90	14.2	8.6	8.9	174 123	249 386	314 109
Korea	2.65	73.40	71.20	23.90	14.2	5.2	33.9	234	5 393	18 430
Ireland	2.90	64.10	64.10	21.80	21.2	5.1	13.7	881	1 891	3 345
Israel	2.54	59.30	70.90	29.90	18.4	4.8*	16.1	4 934	8 279	10 431
Spain	0.97	49.70	54.30	38.60	29.4	4.9	17.6	3 462	15 367	26 960
Greece	0.67	24.20	28.50	48.70	49.5	3.8	ND	968	3 158	6 193
Portugal	0.76	21.30	35.80	69.70	38.6	3.2	15.1	237	1 580	4 170
Malaysia	0.37	44.70	ND	55.30	ND	0.9	ND	229	587	1 001
Mexico	0.43	29.60	25.50	61.30	26.3	0.6	15.5	907	2 901	5 756
Thailand	0.20	9.40	ND	85.50	30.6*	1.0*	21.0*	373	649	1 823
TURKEY	0.64	42.90	33.40	50.60	60.4	1.1	21.4	378	2 471	9 303
Brazil	0.91	40.10	45.50	57.20	43.50	1.7*	23*	1 913	5 440	14 999
India	0.74	27.90	ND	52.00	ND	1.5*	25.0*	13 623	14 883	20 409
High Inc. OECD Ave.	2.24	64.20	69.50	38.50	17.20	6.40				

Source: Guruz and Pak (2003).

The increase in human resources used by the R&D system has been similar to the progress Turkey has experienced in financial inputs. Total R&D personnel per 10 000 people in the workforce, calculated according to Frascati Manual was 6.7 in 1990 and increased to 13.6 in 2000. Yet, this is still way below the high income OECD average for 1991-2001 of 64 in table above.

One related area where Turkey's progress has been impressive was the number of scientific publications by the scientists residing in Turkey. With 355 publications in 1980 Turkey obtained the 41st rank among countries, and by scoring an almost 25-fold increase in about two decades elevated to the 22nd row with 8 677 publications. This jump in the number of scientific publications increased Turkey's share to 0.86%, which is higher than the economic weight (0.5%) of Turkey on the global scale. While this implies that the Turkish R&D system is performing better than expected of a country with such economic performance, the scientific paper share of the country is still lower than its demographic weight of 1.1% in the world.

Furthermore, the technological/commercial performance as compared to the academic/scientific performance has remained quite low, implying that the country has failed to commercialise the scientific production that has shown such a significant progress over the past two decades. The number of patent applications by domestic residents standing at 134 in 1980 increased only to 265 in 2000, while those by foreign residents jumped from 527 in to 3,177 in the same period as a reflection of enhanced FDI penetration. The ratio of foreign to local patent applications for Turkey was 12.0 in 2000 (see Figures 6 and 7 in Appendix D). Although this number compares very favourably to the average of 690 for low-income countries, it is still far below the average of 3.3 for high-income countries.

Some of Turkey's recent R&D performance indicators have been as follows:

- R&D personnel intensity per 10 000 people in the workforce:7.50 in 1990 and 13.10 in 2000
- GERD as percentage of GDP 0.32% (1990) and 0.64% (2000)
- World Ranking (and the number) by the number of SCI journal publications: 41. (1177) in1990 and 22. (8677) in 2002

D.3.2. Private and governmental contribution to R&D

In summary, the focus S&T policy in Turkey has shifted in the 1990's from building a sound scientific infrastructure, to acquiring capabilities in science and technology, not only to achieve excellence in scientific and technological research, but also in converting scientific and technological findings into economical and/or social benefits. With this new perspective, Turkey aims to establish a well-functioning national innovation system.

Although there still is some ground to be covered to bring the level of Turkish research system (in terms of the number and quality of researchers as well as funds at their disposal) up to the EU level, the chief bottleneck facing the Turkish R&D system is the insufficient participation of the industry. Despite some upward tendency (hinted by the following indicators) in the 1990s, the industry has not been willing enough to develop its own mechanisms for innovation, relying instead essentially, on technology transfer, due to the lack of adequate incentives over the past decades and a general lack of a strong R&D culture and tradition.

- Percentage of R&D expenditures realised by Business Sector: 20.4% (1990) and 33.4% (2000)
- Percentage of R&D expenditures financed by Business Enterprises (BERD)**:** 27.5% (1996) and 42.9% (2000)
- Percentage of GERD financed by the Public Sector: 65% (1990) and 50.6% (2000)
- Percentage of R&D expenditures realised by the Higher Education Sector 71.6% (1990) and 60.4% (2000)

By these indicators, expenditures of R&D activities performed by the private sector in Turkey from total was raised to 38 percent in 1999 from 20 percent in 1990. While this rather significant increase of nearly 80 percent in about a decade reflects a change in attitudes and mentality, Turkey still has a long way to go for the R&D efforts in the private sector to start creating significant value added so as to become a significant driving force for economic growth. In terms of the contribution of private sector to R&D in Turkey, the transition from the present shares to the 50 percent threshold, is not an easy one to make, especially in the

light of current political and economic instability environment. This environment adds to the already risky nature of R&D activities, discouraging domestic and foreign investors alike. Even though foreign capital invested in R&D activities has a negligible share in total foreign investment, it has a dominating share in the total amount of capital invested by the private sector.

Table D.5. Foreign investment in R&D activities, June 2003

Sector	Number of Firms with Foreign Partners	Share of Sectoral Foreign Capital in Total Foreign Capital Invested in Turkey (%)	Share of Foreign Capital in Total Capital Invested In the Sector (%)
R&D Activities	15	0.05	88.87

Source: Turkish Treasury (http://www.hazine.gov.tr/stat/yabser/ybsyeniturk.htm)

Table D.6. Total R&D personnel by sector and education level, 1996-1999 averages

Education level	Total		Businesses		Government		Higher Education	
	Total	Full Time Employees	Total	Full Time Employees	Total	Full Time Employees	Total	Full Time Employees
Total								
1996	**58 336**	**21 995**	**6 174**	**4 293**	**7 223**	**4 415**	**44 939**	**13 287**
1997	**63 601**	**23 432**	**9 163**	**5 632**	**7 280**	**4 369**	**47 158**	**13 431**
1998	**62 181**	**22 892**	**9 003**	**5 223**	**6 090**	**3 879**	**47 088**	**13 790**
1999	**66 330**	**24 267**	**9 576**	**5 614**	**6 116**	**4 032**	**50 638**	**14 621**
Ph.D. or above								
1996	20 362	6 507	205	153	653	528	19 504	5 826
1997	21 862	6 824	236	165	679	498	20 947	6 161
1998	23 009	7 274	277	199	625	484	22 107	6 591
1999	25 021	7 730	303	215	658	521	24 060	6 994
M.S.								
1996	19 596	6 834	1 016	828	1 091	810	17 489	5 196
1997	20 279	6 668	1 061	796	1 188	874	18 030	4 998
1998	19 001	6 555	1 013	752	1 165	898	16 823	4 905
1999	20 076	6 969	1 168	887	1 171	935	17 737	5 147
B.S.								
1996	11 830	5 201	2 246	1 753	1 638	1 183	7 946	2 265
1997	13 340	5 785	3 209	2 210	1 950	1 303	8 181	2 272
1998	12 893	5 536	3 422	2 266	1 313	976	8 158	2 294
1999	13 751	5 856	3 608	2 359	1 302	1 017	8 841	2 480
More than High School								
1996	941	606	660	416	281	190	-	-
1997	1 363	818	1 026	631	337	187	-	-
1998	1 465	868	1 058	640	407	228	-	-
1999	1 536	896	1 084	646	452	250	-	-
High School								
1996	3 138	1 606	1 374	830	1 764	776	-	-
1997	3 310	1 761	1 992	1 128	1 318	633	-	-
1998	2 980	1 425	1 889	881	1 091	544	-	-
1999	3 177	1 596	2 105	1 038	1 072	558	-	-
Other								
1996	2 469	1 241	673	313	1 796	928	-	-
1997	3 447	1 576	1 639	702	1 808	874	-	-
1998	2 833	1 234	1 344	485	1 489	749	-	-
1999	2 769	1 220	1 308	469	1 461	751	-	-

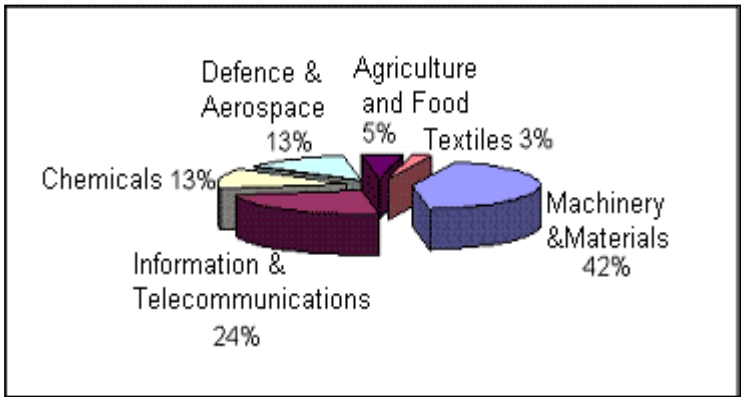
Source: State Institute of Statistics (http://www.die.gov.tr/IstTablolar/26ag436t.xls)

D.4. Technological innovations in different sectors

The R&D powerhouses in Turkey are large companies in defence, automotive, telecommunications and particularly consumer electronics sectors.

In recent years, some small companies have begun to challenge the large companies in innovation contests, despite the smaller amounts of funds they spend on R&D activities. The most prestigious of these technological innovation contests is the Annual Technology Awards Contest organised jointly by TUBITAK, TUSIAD (Association of Turkish Industrialists and Businessmen) and TTGV (Technology Development Foundation of Turkey). The following chart showing the sectoral affiliations of companies that have applied for this year's awards is illustrative of the composition of technological innovations in different sectors:

Figure D.1. Sectoral decomposition of applicants for Technology Awards 2003



The following box shows the companies that have received the award over the past four years, along with a description of each company's activities and their award-winning products.

Box D.1.1. Technology Awards Contest Winners

4th Annual Technology Awards Contest (2002)

Technology Awards :
Company: Infotron Simulation (http://www.infotron.com.tr/)
Received the award for CARDS (Comprehensive Automobile R&D Simulator)

The mission of Infotron Simulation is to create virtual environments through cutting edge technology simulation products to meet the needs of companies operating in defence, automotive and entertainment industries to reach excellent real world performances through virtual world practices.

Company: Tepa (http://www.tepa.com.tr/)
Received the award for: EKG Master USB, a PC-based electrocardiographic (EKG) system, connected and powered by the USB port, and works with desktop and notebook computers.

TEPA is the world's first manufacturer of PC based ECG and Stress ECG Systems that has been designing and producing them since 1986. With distributors in several countries, TEPA has a Research & Development department developing innovative solutions to meet the changing demand of the international health care market.

Company: INFORM Power Electronics (http://www.informups.com/)
Received the award for Digital Signal Processing Power Supply Unit

Inform Power Electronics was established in 1980 with the aim of designing and building industrial automation systems. Soon after, it diversified into the production, and marketing of standard professional electronic equipment, and special projects. Having 15 000 m² closed production area, and backed by its own research and development centre, the company is committed to the development and manufacturing of innovative electrical products and electronic equipment. Its distribution network extends to five continents demonstrating its ability to serve to different markets with different conditions in around 40 countries, with a customised to standard product range used for household to defence industry applications including Uninterruptible Power Systems (UPS), static UPS from 325VA to 800kVA, dynamic UPS from 150kVA to 1670kVA, AC/DC distribution systems, rectifiers and chargers, voltage regulators, static & servo controlled type transformers, electronic boards and various telecommunications applications.

Box D.1.2. Technology Awards Contest Winners (Continued, Previous Contests)

3rd Annual Technology Awards Contest (2001)
Technology Awards:
Company: Sistas (http://www.sistas.com.tr/englishn.htm)
Received the award for Intelligent Power-Universal Switch Mode Power Supply For Telecom Power Systems
Company: Tesan Makina (http://www.tesanmakina.com/index.html)
Received the award for TETRA CAD-Computer Aided Garment Patterning System

2nd Annual Technology Awards Contest (2000)
Grand Prize:
Arcelik, Consumer Electronics (http://www.arcelikas.com.tr/)
Technology Awards :
Faz Elektrik, Electrical Machinery and Motors (http://www.faz.com.tr/)
Hipokrat, Medical Equipment (http://www.hipokrat.com.tr/)
Ozcelik Textiles Machinery (http://www.polyspin.com/)
Honourable Mention:
Sisecam, Glassware (http://www.sisecam.com.tr/)
IMS Software (http://www.ims.com.tr/)

1st Annual Technology Awards Contest (1999)
Grand Prize:
Arcelik, Consumer Electronics (http://www.arcelikas.com.tr/)
Technology Awards:
Eta Electronic Design, Defence –for Electronic Marksmanship Trainer (http://www.etaint.com/)
Petas, Medical Electronics (http://www.petas.com.tr/)
Unimedya Communications, Telecommunications Equipment –for Home ATM (http://www.unimedya.com.tr/)

It is interesting to note that the only large company that has managed to receive an award so far is Arcelik. Even though such giant companies as NETAS and ALCATEL-TELETAS (telecommunications equipment producers), TAI–Turkish Aerospace Industries (producer of

military and civilian aircraft including F16 fighters and their parts), Sisecam (glassware producer), Kordsa (polyester producer) and Pinar Food have been nominated before, they could not get the awards. Ford Automotive, TUSAS–Turkish Aircraft Industries (producer of engines), ASELSAN–Military Electronics Industries, and Eczacibasi Building Materials along with the other consumer electronics giant, Vestel, became grand prize finalists for the first time this year but the winner is yet to be seen.

Given that Arcelik and Vestel are in intense competition in certain products, and that Arcelik has already received the grand prize twice (in 1999 and 2000), this year's competition is of special importance to Vestel group which has been nominated for its MHEG-5 Compatible Analog/Digital TFT TV design. In fact, Vestel and Arcelik are both success stories: Thanks to continuous R&D activity and product innovation, Vestel increased its sales of colour TVs by 1000% between 1994 and 1998, and raised its market share from less than 1% to 13% in the highly competitive European television market. Arcelik has had a similar performance in European white goods market, particularly in the UK. One out of ten domestic appliances sold in the UK are made in Turkey, primarily by Arcelik (Loewendahl and Ertugal-Loewendahl, 2001) – also see the boxes below.

Box D.2. Arcelik's "Digital Living" Project
(http://www.arcelikas.com/kurumsal/02_teknolojik_atilim_dijital.html)

Digital Living Commences

Arçelik brings the "Digital Living" project into reality. With the completion of this project in 2003, you will be able to send a picture from your refrigerator, your washing machine will automatically send a warning to service when there is a problem, and you will be able to control your household appliances directly from your computer at work. With the technological infrastructure Arçelik has created, smart appliances such as the refrigerator, oven, TV, washing machine, and dishwasher will be capable of communicating with each other. The main control for the energy management enables the most economic and stable use of the electrical energy. For instance, it becomes possible to defrost the refrigerator at times when electricity is relatively cheaper. The order in which the appliances operate can be regulated when needed for a stable and secure consumption of the electricity.

Your Oven Will Call the Service

This line of appliances solves the service problems. The appliances, enabled by their technology to notify any dysfunctions, are now able to contact your service. Thus, it is possible that someday you will be informed by your service that the dysfunction in your oven has been eliminated. Another characteristic of the smart appliances is their ability to continuously adapt themselves to new technologies. For instance, when Arçelik develops a new program for dishwashers, it is able to download this new program directly to your machine. You are informed about the new program with the e-mail that arrives in the evening.

Visual Messages to Your Loved Ones

In the future, with the necessary infrastructure provided, the smart refrigerator with stock control ability will be able to answer the question of "what shall I cook for dinner". The smart appliance, which will make a suggestion of a meal and a recipe based on what is available in the refrigerator, will also be able to directly tell your oven how to cook the meal. This technology that will end the era of attaching notes on the refrigerator, will enable the delivery of audio-visual or written messages to members of the family through the screen on your appliance. Not only can you communicate with family members, but also can communicate with your beloved friends who are away through the refrigerator, and send photographs for instance. It is possible to have access to, and control, the smart appliances of Arçelik through the Internet when you are away from home, and from the computer, with the TV remote control, or through the screen on your refrigerator when you are at home. Each of the appliances, which can communicate in a wireless environment under a central monitoring system, can also operate independently. "This new technology is one of the important steps for Arçelik to change its identity as the white goods manufacturer to the identity of one who shares with families the solutions of increasing the quality of home life", said Hasan Subaşı, President of the Consumer Durable Group, who attended the meeting where smart appliances were introduced.

Developed by Turkish Engineers

The Digital Living project, which began in 1998 and brought to life under the leadership of a team of seven people, will start appearing in consumers' homes in 2003. Smart appliances were first demonstrated at the Domotechnica Fair, and have been in display at the showroom in Maslak since April 2001.

Box D.3. R&D Activities at Vestel Group (Selections from http://www.vestel.com.tr/)

The Vestel Group has been a leader in Turkey's consumer electronics sector since the foundation of Vestel Electronics in 1984. In the following years, the Group expanded its operations into television components, personal computers, PC monitors and white goods. The product diversity further increased after its acquisition by the Zorlu Group in 1994. Between 1995 and 1997, the Zorlu Group invested more than US$ 40 million in expanding Vestel Group's capacity and modernizing its business organization, which led to a respective increase in consolidated net sales and exports by 148% and 190% in USD terms, and after-tax earnings by more than 500% during the same period.

Today, the Vestel Group is comprised of thirteen companies operating in manufacturing, technology development, marketing, and distribution fields in the consumer electronics, digital technologies, and white goods. The Group's products include flat TVs, plasma TVs, TFT-LCD TVs, conventional TVs, TV-DVD Combos, IDTVs, digital and analogue receivers, PC monitors, personal computers, no-frost and static refrigerators, and air conditioners.

To back its strategic commitment to high quality and continuous innovation, the Group has been steadily investing in development of new technologies. The Group's research and design teams are the first in Turkey to develop proprietary product designs, and Vestel is the only developer of micro-controller software for use in its production processes. In order to retain its competitive edge in the development of new technologies, Vestel established and added to its portfolio Vestel USA in 1998, and acquired Cabot Communications in the UK, which developed broadcast TV technology solutions.

Vestel Group aimed to be a world leader in the information appliances market and through the information appliances R&D team of its Electronic Design Department, has developed a variety of dedicated internet access devices, including internet set-top boxes, web-phones, internet terminals, and internet kiosks, becoming one of the first research groups in the world to focus on this new area.

Vestel Electronics' R&D team, on the other hand, is specialized in electronic design of display devices including TVs, PC Monitors, Plasma and LCD Displays.

Founded in 1975, Vestel Communications has become the largest producer of analog satellite receivers and DVD in Europe. Vestel Communications formed its own R&D team in 2001 in order to develop new products based on digital technologies. Since the creation of this team, Vestel Communications has been expanding its range in digital products as well as its share in the Group's turnover very rapidly, with the goal of becoming one of the leaders in digital technologies.

A wholly owned subsidiary of Vestel Electronics, Vestel USA has a separate R&D team that collaborates with the other R&D teams within the Group towards development of flat-panel displays, digital TV sets, Interactive-TV set-top boxes, and other high-end consumer electronics products. TFT-LCD TV, HDTV, Projection TV, and MHP set-top-box are among the current projects of Vestel-USA team.

D.5. SWOT Analysis

Strengths	Weaknesses
• Significant progress towards institutionalization in coordination of public support to R&D activities • Strong upward trend in R&D activity, with many smaller firms beginning to take part • Recently established technoparks • Publicity received by successful innovation projects • Strengthening international collaboration • Innovative manufacturing sectors such as consumer electronics, medical equipment, military and defence electronics, textiles, and innovative service industries such as banking and finance	• Uncertainty environment not conducive to risky R&D spending, especially on the part of private sector • Lack of historical roots and a strong tradition for innovation • Low share of private R&D expenditures as compared to public • Failed commercialization of the domestically carried scientific research and research output • Low interest of primary production sectors such as agriculture and mining in innovation
Opportunities	**Threats**
• Increasing political and economic stability • Economic growth rate picking up • Increasing incentives • Turkey's full membership in the 6th Framework Programme	• Prolonged recovery from economic crisis • Political and economic instability

E. INFORMATION SOCIETY TECHNOLOGIES (IST) PENETRATION RATES

E.1. Introduction

According to the World Economic Forum's "Global Information Technology Report (2002-2003), Turkey ranks the 50th in readiness to the IS among 84 countries.

e-Readiness Index

Rank	Country	Point
1	Finland	5.92
2	USA	5.79
3	Singapore	5.74
4	Sweden	5.58
5	Island	5.51
6	Canada	5.44
7	UK	5.35
8	Denmark	5.33
9	Taiwan	5.31
10	Germany	5.29
...	...	...
...	...	...
50	**TURKEY**	**3.57**
...	...	...

Source: World Economic Forum

Turkey's weak position in transformation to information society is also seen in below table where some important indicators of IS in Turkey are presented in comparison to the EU Candidate Countries (CCs) and EU-15 average as well as the USA and the world average.

Table E1. Information Society Indicators 1999/2001 (in millions)

	Turkey	**CC**	**EU-15**	**USA**	**World**
Number of PCs (Dec. 2000)	**3**	**11**	**108**	**161**	**442**
-per 100 inhabitants	4.5	6	25	59	8
Internet hosts (July 2001)	**0.1**	**0.7**	**12**	**79**	**107**
-per 100 inhabitants	0.2 (2000)	1	3.3	29	2
Internet users (Dec. 2000)	**2**	**10**	**91**	**154**	**352**
-per 100 inhabitants	3	6	24	56	6
Mobile phone subscriptions ***(Dec. 2000)***	**16**	**38**	**236**	**100**	**720**
-per 100 inhabitants	24.2	22	63	36	12

Source: Deiss (2001).

Detailed comparisons of the key-indicators in Turkey with respect to the CCs and EU-15, and their evolution during the last years are summarised below.

As indicated in Table E2, the number of cell phone subscribers is expanding very rapidly in the CC countries. During the 1995-2000 period, for example, the growth of cell phone subscribers increased 37-fold compared to an 11-fold increase in the EU. In terms of the 1999-2000 growth in cell phone subscriptions, Turkey scored higher than the CC average of 87.2%, by almost doubling subscriptions.

Table E2. Cell Phone Subscriptions

	Number of mobile phone subscriptions at the end of the year (1 000)				Growth (%)	Number of mobile phone subscriptions per 100 inhabitants			
	1 995	1 998	1 999	2 000	2000/1999	1995	1998	1999	2000
Bulgaria	20	127	350	738	110,9	0,2	1,5	4,3	9,0
Cyprus	44	116	151	218	44,6	6,0	15,5	20,1	32,7
Czech Republic	49	965	1 944	4 346	123,6	0,5	9,4	18,9	42,3
Estonia	30	247	387	557	43,9	2,0	17,0	26,8	38,7
Hungary	265	1 070	1 628	3 000	84,3	2,6	10,6	16,1	29,9
Latvia	15	168	274	401	46,5	0,6	6,8	11,2	16,6
Lithuania	14	268	332	524	57,8	0,4	7,2	9,0	14,2
Malta	11	23	37	114	209,2	3,0	6,1	9,6	29,5
Poland	75	1 928	3 956	6 747	70,6	0,2	5,0	10,2	17,5
Romania	9	643	1 400	2 499	78,5	0,0	2,9	6,2	11,1
Slovakia	12	465	918	1 294	40,9	0,2	8,6	17,0	24,0
Slovenia	27	196	614	1 086	76,9	1,4	9,9	31,0	54,6
Turkey	437	3 506	8 122	16 133	98,6	0,7	5,3	12,2	24,2
TOTAL CC	**1 008**	**9 722**	**20 113**	**37 658**	**87,2**	**0,6**	**5,6**	**11,7**	**21,8**
EU-15	21 160	90 145	146 579	235 745	60,8	5,7	24,1	39,1	62,6

Sources : *ITU* *Data for Slovenia in 1995: Eurostat;*

Source: Deiss (2001).

While the number of PCs per 100 inhabitants in the CCs is about five times lower than in the EU-15 (about 6 versus 29), it tends to grow more rapidly. The growth in 1999 was more than twice as fast as in the EU. Turkey is one of the three countries that has the lowest PC density among the group of CCs (Table E3)

Table E3. PC Use in the Candidate Countries and EU-15

Total number of PCs (1 000)					Growth 1998-99 (%)	Number of PCs Per 100 inhabitants				Share of all PCs used (% in 1999)	
	1990	1998	1999	2000		1990	1998	1999	2000	Households	Businesses
Bulgaria	-	200	220	361	10.0	-	2.4	2.7	4.4	7	93
Cyprus	5	94	130	-	38.3	0.7	12.6	17.3	-	48	52
Czech R.	120	1 000	1 100	1 342	10.0	1.2	9.7	10.7	13.1	24	76
Estonia	100	165	195		18.2		11.3	13.5	-	61	39
Hungary	-	660	750	870	13.6	1.0	6.5	7.4	8.7	30	70
Latvia	-	150	200		33.3		6.1	8.2	-	14	86
Lithuania	-	200	220		10.0		5.4	5.9	-	32	68
Malta	5	60	70	80	16.7	1.4	15.9	18.1	20.6	-	-
Poland	300	1 900	2 400	2 670	26.3	0.8	4.9	6.2	6.9	23	77
Romania	10	480	600	713	25.0	0.0	2.1	2.7	3.2	32	68
Slovakia	-	350	400		14.3		6.5	7.4		25	75
Slovenia	-	420	500	548	19,0		21.2	25.3	27.6	54	46
Turkey	300	1 550	2 200	3 000	41,9	0.4	2.3	3.3	4.5	-	-
Total CC	-	**7 229**	**8 985**	**11 000**	**24,3**		**4.2**	**5.2**	**6.4**	**46**	**54**
EU-15	25 400	84 725	93 200	107 830	10,0	7.0	22.6	24.8	28.6	-	-

Source: Deiss (2001)

The number of Internet users in the CCs grew by more than 30% in 2000 alone, but fell short of the over 60% growth in the EU area. The number of Internet users per 100 inhabitants for Turkey was below 15% of the EU average.

Table E4. Number of Internet Users in the Candidate Countries and EU-15

	Number of Internet users (1 000)			Growth 1999/2000 (%)	Number of Internet users per 100 inhabitants		
	1998	1999	2000		1998	1999	2000
Bulgaria	150	235	430	83.0	1.8	2.9	5.2
Cyprus	68	88	120	36.4	9.1	11.7	18.0
Czech Republic	400	700	1 000	42.9	3.9	6.8	9.7
Estonia	150	200	366	83.0	10.3	13.8	25.4
Hungary	400	600	715	19.2	3.9	5.9	7.1
Latvia	80	105	150	42.9	3.3	4.3	6.2
Lithuania	70	103	*150*	45.6	1.9	2.8	4.1
Malta	25	30	40	33.3	6.6	7.8	10.3
Poland	1 580	2 100	2 800	33.3	4.1	5.4	7.2
Romania	500	600	800	33.3	2.2	2.7	3.6
Slovakia	500	600	650	8.3	9.3	11.1	12.0
Slovenia	200	250	300	20.0	10.1	12.6	15.1
Turkey	450	1 500	2 000	33.3	0.7	2.2	3.0
TOTAL CC	**4 573**	**7 111**	**9 521**	**33.9**	**2.6**	**4.1**	**5.5**
EU-15	34 506	55 942	91 285	63.2	9.2	14.9	24.2

Source: Deiss (2001)

E.2. IST in major service sectors

In this section, information on presence and speed of implementation of the IST in telecommunication, transport, financial and postal services are presented.

E.2.1. IST in telecommunications

The past decade was one of significant developments in the area of telecommunications in Turkey. In addition to the introduction of internet to public outside the academia for the first time,[17] the 1990s witnessed a mushrooming of private radio stations and private TV networks through substantial investment whose tendency to grow continued into the 2000s.

In terms of telecommunications infrastructure, Turkey had a very fast development in the 80ies and 90ies. A variety of networks and services have been developed by using advanced digital technologies. To give a brief outlook of recent infrastructure, changes in the Turkish telecommunication network and mobile service between 1997-2001 is summarized in Table E5 below (Elci, 2003).

Table E5: Data for Turkish Telecommunication Network and Mobile Services

	1997	**1998**	**1999**	**2000**	**2001**
Population	62,866,000	63,926,000	64,848,000	65,700,000	68,610,000
Household	13,200,000	14,000,000	14,202,000	14,400,000	15,086,158
Main telephone lines in operation	15,744,000	16,960,000	18,060,000	18,395,000	18,904,000
Digital Mobile Phone	1,483,000	3,382,000	8,000,000	16,041,000	18,229,000
% digital mainlines	81.6	82.9	84	87.3	88.8
% of residential mainlines	74.1	75	74.8	75.9	76.3
Residential mainline per 100 households	88.3	90.9	95.1	97	95.6
Cable TV Subsriber	512,000	611,000	734,000	883,000	908,662

Source: Turk Telekom and International Telecommunication Union (ITU) database

The existing communications network in Turkey was established by Turkish Telecom. With 100,000 kilometres of fibre optic SDH and STM 16 (2,4 Gbps) capable of meeting international standards as of 2001, Turkey's was the 4th largest network in Europe.

The most recent initiative of Turkish Telecom regarding infrastructure investment is a tender it has called for a submarine fibre-optic cable system, aiming to provide a wide-scope access from the Mediterranean through to Europe and the USA. The project requires the construction of a submarine fibre optic cable system between a terminal station in Turkey and a terminal station in Italy, France or Spain. Total traffic carriage capacity of the system to be built is 1,28Tbit/s. This capacity will be enhanced phase by phase, beginning from 20Gbit/s. The system must feature power feeding by the latest cable types, computerised control and high-capacity of DWDM accoutrement. (Ozalp, 2003a).

[17] See Annex B1 for a detailed discussion on the historical development of internet and internet infrastructure in Turkey.

Turkey was introduced to GSM technology in 1994, to provide service to subscribers in Istanbul, Ankara and Izmir, the three largest cities in Turkey, initially. In 1998, the GSM licenses were issued to two Turkish companies, Turkcell and Telsim, for 25 years. A Turkish-Italian joint venture was formed later adding Aria to existing operators. Turkish Telecom later created its own GSM operator, Aycelll, as a part of efforts to facilitate privatisation.

In Turkey, the GSM market keeps on growing and the number of GSM subscribers has exceeded the number of Public Switched Telephone Network (PSTN) subscribers in 2002 as indicated in Table E6 below (over 25 million as of March 2003). Mobile telecommunications have proved that Turkish market provides investors with unpredictable growth opportunities that outperformed other markets with similar size and income. GSM operators are introducing their data services on GPRS networks, and mobile internet connection is believed to be a rival to traditional dial-up connections in the mid-term (SPO, 2003).

The internet transforms the structure of the telecom sector by redefining the limits and meaning of competition through new services and markets. For the establishment of internet infrastructure, Turkey has preferred the DSL technology which allows the use of existing telephone lines. Thanks to the large-scale investment in voice communications infrastructure started in the 1980s, the internet access may grow rapidly. On the other hand, as also emphasised in the declarations of the Internet Supreme Council issued together with the sectoral NGOs, delays in liberalisation of Turkish Telecom have led to high prices, low quality and insufficient infrastructures and products due to lack of competition in the market which, in turn, hindered development of the Internet in Turkey.

Following the conclusion of Turkish Telecom's ADSL tender of 60,000 ports, the ADSL tender of 200,000 additional ports were concluded in 2003. When the project is completed and around 200,000 ports are delivered, there would be a significant effect on the broadband infrastructure. This would also have high impact on the broadband access prices which has not taken off due to high price and lack of service area coverage. Currently Turkish Telecom's DSL infrastructure capacity is about 4,300 ports (SPO, 2003)

UlakNet (National Academic Network) is connecting all state universities, several public institutions, and Armed Forces R&D departments since 1997. Starting from the mid-2002, a new project has been initiated to improve UlakNet infrastructure. In November 2002, the new improved infrastructure started to operate that increased the international capacity 10 times, from 64 Mbps to 620 Mbps, and provided the initial connection to the European Academic Network (GEANT) with 155 Mbps. As a result, all university branches at rural areas are covered; the number of users reached 300,000 and universities and R&D institutions are started to connect 4 to 75 times faster than before.

As dial-up connection has been the main type of internet access, private Internet Service providers (ISPs) dominate the market. There are 88 private ISPs and there is one (TTNET) owned by Turkish Telecom. There is remarkable increase in the number of ISP subscribers. It increased by 30% from 609,533 to 796,594 between 2000-2001 for private ISPs. Rate of increase is 1409% for TTNET from 13,000 subscribers to 196,666 in the same period. The dominant private ISP is Superonline (www.superonline.com) with a market share of approximately 25%. Insufficiency in the quality of the Turkish Telecom's infrastructure is a big problem for ISPs as their service quality directly related with it.

Users of Turkish Telecom's cable internet that operates using Cable TV infrastructure is quite low (around 8,000 subscribers) compared to the number of its potential subscribers (2 200 000). The main reason is the high initial costs (about €240 for a modem and ethernet card).

At present, the number of cable TV subscribers is around one million (Table E6). Cable TV network set up and operated by Turkish Telecom, was designed with TV viewers, rather than internet users, in mind. Given the unavailability of service in many towns and cities, and the availability of alternatives such as satellite dishes and digital TV networks, cable TV subscription did not catch on and become popular.

Table E6. Main Telecommunications Indicators for the Period of 2001-2003

Indicators	**2001**	**2002**	**2003 (estimated)**
PSTN Exchange Capacity	21 341 000	21 841 000	21 941 000
PSTN Subscribers	18 904 000	19 000 000	19 100 000
PSTN Penetration *(%)*	27,3	27	26,7
Mobile Phone Subscribers			
Analog (NMT 450)	69 971	54 971	40 000
Digital (GSM)	18 229 000	25 000 000	28 000 000
Mobile Phone Penetration	26,5	35,6	39,3
Number of Payphones	71 149	74 055	83 925
Fiber/Optic Lines *(Km)*	77 340	81 340	84 340
Cable TV Subscribers	908 662	950 000	1 050 000
Number of Internet Users	2 500 000	4 000 000	6 000 000

Source: SPO, Turk Telekom

Currently, Turkey is one of the 17 countries in the world that have their own satellites orbiting the earth. 50 digital and analog television stations are broadcasting via TURKSAT satellites with a coverage area extending from Japan to Iceland (Tuzun and Sezer, 2003).

At present, 261 TV and 1200 radio stations are on the air, broadcasting to national, regional or local audiences. (Tuzun and Sezer, 2002). With as many as 8 multipurpose private networks (ATV, Flash TV, Kanal D, Kanal 6, Kanal 7, Show TV, Star TV and TGRT); two private news/documentary-only networks (CNN-Turk and NTV), a number of music-video networks; five channels operated by TRT, the state radio and television organisation, broadcasting nationwide, as well more than 200 local channels scattered across the country, Turkish public has free access to an enviable level of variety of TV broadcasting which could be matched by a few countries, if any. With the charged subscriptions to the cable TV network, pay TV and digital broadcasting networks (CINE5, Digiturk and Star Digital), and satellite dish options, the variety becomes practically unlimited making Turkey a heaven for TV-lovers. The dominant one, Digiturk, has around 600,000 subscribers as of 2003. Digiturk is also operated as an interactive/internet TV. TV is the most popular media in Turkey, followed perhaps by radio. The high number of private and university-operated radio stations makes frequency-allocations very difficult in some towns.

Although it is difficult to document this phenomenon, Turkish channels are widely watched in many countries –and perhaps are a lot more popular than local channels in some countries like Azerbaijan. In addition to private channels that are very popular among satellite dish owners

in countries like Egypt, Iran and Israel, the state radio and television organisation has one channel (TRT-INT) devoted to broadcasting for Turks living abroad and Turkic speaking nations in Central Asia. TRT-INT is also carried by cable TV operators in many countries.

E.2.2. IST in transport

As stated in the contribution of Turkey to *eEurope+ First Progress Report*, various intelligent transportation systems projects are being conducted in various sectors.

In urban transportation systems, projects like single-point signalisation management, visual control of main arteries by cameras, common ticket system for the integration of different means of transportation are conducted by Istanbul, Ankara, Izmir and Bursa Metropolitan Municipalities.

Concerning highways and freeways, the projects that are under way are automatic passage system under the electronic toll collection system, weather conditions information and warning system, driver and traffic information system, and active weight measuring system.

In fact, the General Police Department has already completed the Traffic Information System (TIS) project, perhaps the most comprehensive eGovernment project in Turkey to date, and the first e-state practice in the world to allow traffic security and highway patrol teams to check for vehicles and drivers violating traffic rules via tablet PC's using GPRS and GPS technologies. The TISP aims to provide a communication channel for continuous flow of information among traffic security and highway patrol teams, making traffic control on highways and city centres more efficient. Solutions offered by the TIS include fines being charged on location through the internet; instant on location access to the databases containing driver's licence and vehicle registration information, as well as individual records and accumulated violation penalty points for each driver; ability to track the location of nearest security teams through a map of Turkey at the information centre; instant communication of information on accidents and accident locations, and increased ability to analyse and publicise statistics about accidents.

The TIS project was carried out by Siemens Business Services (SBS) of Turkey using Turkcell's GPRS infrastructure and was inaugurated through a demonstration meeting held on July 10, 2003 (Ozalp, 2003b).

In addition, “MOBESE/FOUR-C" (the City Direction Centre) project for municipal transportation services, wherein the Turkish GSM operator Turkcell participated as a project associate, was awarded a prize for the Interpro Best Mobile Application in 2002 which is the most prestigious awards in ICT sector in the country. With its nationwide and modern GPRS substructure, Turkcell has become the preferred mobile operator to participate in major mobile e-state projects.

Furthermore, due to the heavy marine traffic on Istanbul and Canakkale straits connecting Black Sea to Aegean and Mediterranean Seas through Marmara Sea, and the threats posed by sea accidents (particularly those involving oil tankers) to populations living on both sides of Istanbul and Canakkale, a major automation project for monitoring and controlling sea traffic flow has been started.

E.2.3. IST in financial services

Liberalisation of financial markets and structural adjustments in the 1980s had a significant impact on the financial services sector in Turkey, and the sector as a whole went through a substantial restructuring in the 1980s. The number of banks and financial intermediaries quickly grew, intensifying competition. With the liberalisation of regulations, foreign banks and financial institutions also entered into the domestic financial markets, creating additional competition.

Among other things, this intensifying competition reflected itself upon the quickly increasing number of financial products and the diversity of financial services, and provided the impetus for steps taken towards the modernisation of services. The information revolution in the Turkish financial system in the 1980s first became visible when Automatic Teller Machines (ATMs) were made available for cash withdrawals. Major banks with a nationwide presence quickly and completely automated their branches, immediately starting to provide a continuously increasing variety of customer services through their Point-of-Sale (POS) and ATM terminals, and later, through phone-based and internet-based home banking facilities. At the end of 1998, there were 8,363 ATMs installed in Turkey, representing a rise of 24% over 1997. In addition, through significant investments in the payments infrastructure by the members of Bank Card Centre (BCC), many POS terminals were installed to authorise and record transactions at merchant outlets. At the end of 1998, there were 113,816 POS terminals representing an increase of 94% over 1997. The introduction of new technology led to substantial improvements in the efficiency and variety of services, particularly the payments services throughout the country. Users have also been quick to adopt the new instruments and services (Bank for International Settlements, 2000).

The banks strongly encouraged the use of ATMs for cash withdrawals, making them available even in small towns in the remotest corners of the country. As a result, the ATM usage has grown considerably. Many banks have shared their ATM networks, allowing even small banks to offer ATM services to their customers (Bank for International Settlements, 2000).

Before the 1980s, cheques and promissory notes were perhaps the only non-cash payment instruments and were not commonly used except for settling payments between businesses. In recent years, electronic and card-based instruments have been increasingly substituting both cash and paper-based instruments. Many banks and retailers have developed various electronic payment products, and encourage their use by offering cash returns or gifts for pre-specified amounts of spending made with their cards. As a result, the use of electronic transfers for both retail payments and high-value transactions has considerably increased, forcing banks to continuously update their technology. Almost all commercial banks now offer home banking facilities via telephone and over the internet, allowing customers to complete all sorts of banking transactions, including the purchase and sale of securities from home. While home banking through phone has become very common, many banks are offering RTGS transfer facilities free of charge to encourage the use of internet services.

Bank customers can also use internet to issue standing orders for regular payments for bills, rental payments etc. that are executed automatically on specified dates (Bank for International Settlements, 2000).

Turkish Central Bank has played a critical role in the modernisation of financial services, by initiating a number of major projects to develop secure, reliable and efficient interbank

payment and settlement systems. In particular, the Turkish RTGS system, TIC-RTGS, has given the financial sector an efficient funds transfer system. In the electronically operated clearing houses in Ankara and Istanbul, banks transmit cheque information to the central computer of the clearing house round the clock to settle payments (Bank for International Settlements, 2000).

This improvement in services required heavy investment in information infrastructure, communications equipment and personnel training. While this investment caused marked increases in the non-interest payments of the financial balances of banks and other financial institutions, it led to significant productivity gains as well. Despite the required increases in investment expenditures, the Turkish financial sector adopted state-of-the-art technologies at an impressive speed during the 1980s and thereafter, and have always remained up-to-date by continuously introducing new technologies to Turkey in a timely fashion, and by creating user-friendly yet sophisticated phone- or internet-based banking environments. An innovative Turkish company, VeriPark (www.veripark.com) holds 40% of the internet banking market[18] while the rest is held by the subsidiary software companies of banks (such as Garanti Teknoloji of Garanti Bank(www.garantiteknoloji.com.tr/) and Oyak Teknoloji of Oyak Bank (www.oytek.com.tr)). VeriPark is an example of the young and dynamic software development firms in Turkey. The company was established in 1998 in an incubator (Bogazici University Technology Development Centre, Istanbul) by two entrepreneurs recently graduated from university 2 years later the company graduated from the incubator with 17 staff. Now they employ 40 software specialists and make an annual turnover around €1.5 million 45% which is from internet banking software applications and consulting.

Together with the continuing financial market liberalisation, the developments in information and communication technologies also contributed to a change in the composition of Turkish banking system in the 1990s: the number of wholesale banking institutions with a few branches increased, causing a decline in the market shares of large banks with a nationwide network of many branches (Turkish Banking Association, 1999).

By the Turkish Banking Association figures, there are 56 banks currently operating in Turkey of which 42 are commercial banks and 14 are development and investment banks with fewer branches. After the banking crisis of 2001, many banks went bankrupt and were closed down or merged with other banks, with the remaining banks getting forced to strengthen their financial structure. It is likely that there are still more players in the Turkish banking sector than necessary, given the size of the market. It must therefore be expected that competition in the sector and search for financial stability and strength will drive some more banks out of business or will lead to new mergers, leading to the creation of a healthier financial system made up of banks with reasonably high market shares. The competition for survival must also be expected to contribute to further improvements in service quality and variety, and hence, to the maintenance of momentum in the use of information and communication technologies.

E.2.4. IST in postal services

Turkish PTT adopted the zone (or ZIP) codes enabling the use of optic readers for classification of postal deliveries in the late 1980s to increase efficiency of postal services. While they are still not consistently used by all individual users, the coding substantially

[18] Annual volume of banking software market is about €7 million, €2 million of this amount is the volume for internet banking.

improved the efficiency of mass mailings of ads and the like by companies, banks etc., as well as mass mailings by government agencies such as electoral ID cards and the like.

Still, the high rates of growth in internet and phone usage are rapidly changing the methods of communication from traditional to modern –and more modern technologies as the case of preference shift from fixed-line telephones to cell phones would indicate. The ordinary mail (or snail mail, as it is called these days) has quickly lost its status as the main tool of written communications ten years ago and is being replaced by the internet or voice communications. The number of domestic letters, mails and greeting cards sent in 2000, for example, declined by more than 25% between 1992 and 2000 by the figures revealed by the State Institute of Statistics. While it is difficult to make precise comparison, it is safe to argue that a substantial portion of those mails sent in 2000 is made up of mass-mailed information booklets, sales announcements, and written ads (or "junk mail" as sometimes called) rather then individual notes of communication.

Due to the serious decline in the popularity of traditional methods of communication, the Postal Authority (which emerged as an independent state-owned company after the partition of PTT) began to offer additional services. The most important one among these services is that post offices now provide fund transfer facilities to its account holders. In 1998, for example, 55,130,000 transfers were executed, up by 6.85% from 1997, with 13,059,000 being processed via Turkish Interbank Clearing - Real Time Gross Settlement System (TIC-RTGS), 12,828,000 via the post offices and 29,221,000 via the interbank clearing houses (ICHs) (Bank for International Settlements, 2000).

E.3. IST in major manufacturing sectors

Turkey is a dynamic emerging market economy. Industry accounts for some 19.7 percent of its GDP, agriculture for 13 percent, and services for 67.3 percent. An overview of the economic indicators with respect to the main sectors is given in Table E7 below.

Table E7. Overview of the economic indicators by sectors

	1999	2000	2001	2002	2003*
GROSS NATIONAL PRODUCT (GNP)					
At current prices ($ Million)	185.267	200.002	145.693	180.892	239.235
GNP Per capita ($)	2.879	2.965	2.123	2.598	3.383
GNP - RATE OF GROWTH BY SECTORS (%)					
Agriculture	-5,6	3,8	-6,0	7,4	-2,4
Industry	-5,1	5,6	-7,4	7,9	7,3
Services	-3,9	6,5	-6,1	6,0	5,1
GNP	-6,1	6,3	-9,5	7,9	5,9
GDP COMPOSITION BY SECTORS (%)					
Agriculture	16,0	15,4	12,8	13,0	13,4
Industry	19,0	20,0	21,1	19,7	18,5
Services	64,9	64,6	66,1	67,3	68,2
PRODUCTION					
Value Added in Agriculture at 1987 prices (TL Billion)	15.426	15.962	14.994	15.978	15.549
Value Added in Industry at 1987 prices (TL Billion)	31.814	33.738	31.194	34.142	36.793
Production index of manufacturing Industry (1997=100)	95,9	102,1	92,4	102,5	112,1
Capacity utilization in manufacturing Industry (Weighted average)	72,4	75,9	70,9	75,4	78,4
FIXED INVESTMENTS (TL Billion)	16.863.755	27.688.468	32.408.981	46.031.221	61.179.859
Public (TL Billion)	4.435.215	7.983.004	10.047.332	15.880.805	14.969.350
Private (TL Billion)	12.428.540	19.705.464	22.361.649	30.150.416	46.210.509
EMPLOYMENT					
Civilian labour force (1000 persons)	22.925	22.031	22.269	24.347	23.206
Civilian employment (1000 persons)	21.236	20.579	20.367	21.658	20.811
Agriculture	8.595	7.103	7.217	7.618	6.799
Industry	3.664	3.738	3.734	3.953	3.836
Services	8.976	9.738	9.416	10.086	10.176

* Provisional

Source: Under Secretariat of Foreign Trade

Weight of manufacturing sector in the industry is 86.92%, while the weight of electricity, gas and water is 8.19% and that of mining is 4.89%. The leading sub-sectors in manufacturing industry are refined petroleum (weight is 14,48%, textile (10,88%), food and beverage (10,64%) and chemical products (10.34%). Total exports in 2003 are around €46 billion 83.4% of which is realised by the industry.

Turkish manufacturing industry is mainly composed of private sector companies and dominated by SMEs (companies with up to 250 employees). More than 80% of production and 95 percent of gross fixed investment is realized by private sector. The share of SMEs is 99.5% in total number of establishments, 65% in total employment, 26.5% in investments, 35% in added value, and 10 percent in exports. There are around 1,100,000 small enterprises and 350,000 medium enterprises in the country.

The share of low technology sectors (textile and clothing, food, etc.) is the highest in the Turkish manufacturing industry. These sectors have a production and value-added share of around 30% in total production and value-added share of the whole manufacturing industry. In medium-low technology group, nearly 70% of the production is realised by non-metallic minerals, petrol refineries and iron and steel sectors. On the other hand, in terms of value-added, ship building, non-metallic minerals and petrol refineries have a highest portion than

iron and steel. Automotive, chemicals and machinery sectors accounts for almost 85% of the production, value-added and investments in medium-high technology sectors. In high-tech sector, electronics and communications, and pharmaceuticals are the sectors creating value-added.

Parallel to the trends in other OECD countries, foreign trade of high and medium-high technologies sectors has been increasing in Turkey since 1990. While the shares of high and medium-high technologies sectors in foreign trade volume were about 8% and 30% in 1990, they increased to 15% and 34% in 2000. Shares of low and medium-low technologies sectors in foreign trade decreased from 35% and 25% to 27% and 21% respectively.

On the other hand, export of the manufacturing industry increased nearly remarkably between 1990-2002, from approximately €10 billion to €30 billion. Although quite low in total exports, there is an increase in the share of export of high and medium-high technologies products in the same period (from 2.5% and 14% to 7.5% and 19% respectively). Electronics and communications have the largest share which nearly accounts for the half of the exports in high-tech sector. In this sector, export in electronics sub-sector is increasing dramatically. State-of-the-art production of TV equipment by local companies like Vestel[19], Beko and Arcelik[20] has the most important role in that respect. In 2002, 11.5 million units were exported (the figure was 1.2 million in 1996) and the share of Turkish companies in European market has reached 50%.

Software development is one of the emerging sectors in Turkey. There are about 6000 companies in the sector. Nearly 100 of them produce and sell original products and their total sales approximately amount to €160 million as of 2002. An example of such companies (VeriPark) is already presented above.

Low investments in R&D and innovation are one of the most important shortcomings of the industry.[21] The only sector with remarkable investment in R&D is electronics and communications (R&D intensity is 5.41%). Although the share of services sector is very high in GDP as shown in Table E7 its share in total commercial R&D expenditures is quite low (3%).

According to the result of last "Technological Innovation Activities Survey in Manufacturing Industry"[22] conducted by the State Institute of Statistics (SIS) for the period of 1998-2000, 29,4% of total firms operating in manufacturing industry engaged in technological innovation activity. Technological innovation activity rate increased 4,8% compared to 1995-1997 results. Of total firms undertaking technological innovation activity, 26,3% performed product innovation, 36,4% process innovation while 37,3% performed both. Survey results shows that the propensity of manufacturing firm to innovate increases with firm size. While the propensity of undertaking technological innovation activity is around 20% for the firms with 10-49 employees, it increases to 40% for the firms with 250-999 employees and to 59% for the firms with 1000 or more employees. As regards the sub-sectors engaged in innovation

[19] Vestel (www.vestel.com.tr) is the fourth major company in Turkey in terms of its sales from production. Visit http://www.iso.org.tr/inghtml/ingsiteindex.html for the major companies in Turkey.

[20] Beko (http://www.beko.com.tr/) and Arcelik (http://www.arcelik.com.tr/) are two subsidiaries of Koc Holding (www.koc.com.tr) , one of the oldest and largest firms in Turkey operating in various sectors.

[21] Gross Domestic Expenditure on R&D (GERD) as a percentage of GDP was 0.64 percent in 2000 while the EU average was 1.9%. For more information see "Innovation Policy Profile: Turkey" at http://www.cordis.lu/innovation-policy/studies/geo_study3.htm#workingdocs

[22] http://www.die.gov.tr/english/SONIST/sonist.html

activities, office, accounting and computing machinery ranks the first (66.7% of total firms in the sector are innovating) which is followed by electrical machinery sub-sector (66.6%). Less innovating sub-sectors are leather and footwear (8.9%) and textile (17.9%). Between 1995-1997 period and 1998-2000 period there are not major changes in the share of innovating firms in above sub-sectors except the electrical machinery which doubled its number of innovating firms. According to the results of 1998-2000 survey, improving production quality and extending product range are the most important objectives for innovation in manufacturing sector firms while improving product quality, reducing labour cost and opening up new markets and increasing domestic market share were the major driving forces in 1995-1997 period.

According to the result of the same survey conducted by the SIS for the services sector, 38,5% of total firms in selected five sub-sectors (telecommunication financial intermediation, insurance and pension funds, activities auxiliary to financial intermediation, and computer and related activities) engaged in innovation activity in 1998-2000. The percentage of performing technological innovation activity in those sectors decreased 9,7% compared to the period of 1995-1997. The survey revealed that telecommunications is the most innovative sub-sector where 80% of total firms are innovating. The sub-sector titled "Activities auxiliary to financial intermediation" is the least innovating one (28.2%). In computer and related activities sub-sector, the share of innovating firms in total firms is 49.5%. When compared with the 1995-1997 results, while telecommunications increased its share of innovation firms (from 60% to 80%), the figure decreased in computer and related activities sub-sector (from 59.4% to 49.5%). While, according to the results of the 1995-1997 survey, fulfilling regulations and standards was the most important driving force for innovation in telecommunications sector, improving product quality, extending product range, and opening up new markets and increasing domestic market share were the most important reasons to innovate in 1998-2000 period. This indicates preparation of sector companies for competition in the market to be realised in 2004. It is expected that innovation in private telecommunications sector will continue to increase with the new entrants, like Sabanci Telekom,[23] in the competitive telecommunication market.

Concerning the adoption and use of IST in the manufacturing industry, almost all large firms have made significant investments in this area. The applications vary from computer-aided design and automated process control in production to e-business applications[24]. Most of the large companies have started their eTransformation projects[25]. However, the situation in SMEs is just the opposite. Results of a survey conducted by Microsoft-Turkey in January 2003 revealed that only 23% of SMEs own and use PCs. Out of this figure, 80% of SMEs has internet access and 53% has their websites. Only 7% of those SMEs carry out eCommerce activities as opposed to 20% in the EU. Most of the SMEs that make use of IST are located in the provinces where industry is well developed and concentrated (mainly in Istanbul, Ankara, Bursa, Izmir, Denizli, Gaziantep and Kayseri). On the other hand, there are remarkable efforts by the private sector to provide e-business services for SMEs. There are a number of

[23] Sabanci Telekom (http://www.sabancitelekom.com.tr/) founded in the beginning of 2003, offers services in the telecommunications sector as the first private telecom operator in Turkey. It is a subsidiary of Sabanci Holding (http://www.sabanci.com.tr/), one of the oldest and largest companies in Turkey operating in many sectors.

[24] For instance, Eczacibasi Holding (http://www.eczacibasi.com.tr/), again one of the oldest and largest companies in Turkey implements its eCommerce activities at http://www.girisimpazarlama.com.tr/

[25] As an example visit http://www.kocbilgi.com/en/etransformation/board03.asp for eTransformation project of Koc Group.

eCommerce portals[26] operating for this purpose where SMEs in manufacturing and services sectors carry out their eCommerce activities.

There are also Government measures to increase IST uptake in enterprises. The most important initiative is the KOBINET (or SME-Net in English), which is the Information Network among SMEs, was established in April 1998 as a part of "Go Digital" initiative, aiming to digitize the SMEs. KOBINET is managed by the Small and Medium Industry Development Organization (KOSGEB) and provides basic set of services including free e-mail address and free website space for SMEs in six languages (English, German, French, Italian, Spanish, and Russian). In addition, SMEs can access to information regarding markets, statistics, economic legislation, EU related information, business opportunities and financing. Currently KOBINET has approximately 16,000 registered members. The only regional initiative is taken by the South Eastern Anatolia Project Administration to establish an eCommerce portal for the region, which is the least developed region in Turkey. As of the first quarter of 2004, there are 42 firms that are prepared to take part in the portal.

As mix of private and public sector efforts in dissemination of internet use, there is quite a large number of Internet cafés spread all over the country. For the year 2000, the number of Internet cafés that provide cheap Internet access for public is estimated as around 10,000. They provide users with very cheap access to the Internet (less than €1 for one hour connection). Opening new Internet cafes are encouraged for stimulation of the use of the Internet among young people, and small and medium size enterprises (SMEs) who cannot afford their own computers and communication infrastructure. Those established in the industrial areas under the organised industrial zones and chambers provide free of charge web page and an e-mail address to the SMEs. This initiative is supported by KOSGEB.

One of the main goals of eTransformation Turkey Project is to enable businesses benefit from ICT in order to compete globally. KOSGEB is responsible for "Informing and increasing the awareness of SMEs about eCommerce and e-business" through pilot programmes and seminars that will be designed and implemented in 2004. For this purpose, KOSGEB cooperates with the Under Secretariat of Foreign Trade, Union of Chambers And Exchanges of Turkey, Export Promotion Center of Turkey, Exporters Assembly of Turkey Confederation of Tradesmen. Preparing a digital registry system for private firms, promotion of e-document and eCommerce by proper financial instruments, producing eCommerce statistics are among the issues to be handled as well.

E.4. IST in public services

This section presents information on presence and speed of implementation of IST in public administrations, health and education services. As an indicator of the low capacities in transferring demonstrated applied knowledge in high business developments in the country, the case of virtual museums is presented at the end of the section.

E.4.1. IST in public administration

The Turkish Public Administration Network (Public-Net or Kamu-Net in Turkish) project involves the connection of all government organizations to the internet through a two-step process. The first step was the connection of the Prime Ministry and most of the ministries by

[26] Examples of these portals include TurkTicare.Net (http://www.turkticaret.net/), KOBILINE (www.kobiline.com), THS (www.buynowfromturkey.com) and Perpa (www.perpa.com).

the end of 1999. The second step was the connection of remaining ministries and other public organizations by the end of 2000. However, the lack of funds caused delays in this plan. Nevertheless, by the help of Public-Net, Turkish public organizations will be able to disseminate government information on the internet and offer certain government services on-line.

The objectives are multiple. All government documents except for classified ones will be put on internet. By connecting all public organizations to the net, the government aims to increase productivity in public sector, reduce red tape, increase accessibility as well as the transparency of government information. Moreover, the new structure has the potential to make public servants more accountable, and to decrease the cost of production, storage, retrieval, and dissemination of government information. It may also reduce the cost of giving public services, discourage the tendency to block and hide information, and encourage transparency in the public sector (Yildiz and Cagiltay, 1999).

While the web sites of public agencies making information on their services and legal arrangements related to their powers and areas of duty serve to increased transparency and public accessibility, an important step in this direction was taken prior to the spread of internet access to all parts of the country in 1994. Pursuant to a protocol signed between the Turkish Parliament and State Radio and TV Broadcasting Organization (TRT), TRT began to broadcast proceedings, floor discussions and the voting sessions at the Turkish Parliament on one of its TV channels after December 1994. Then, some of the municipalities began to broadcast the bidding processes leading to municipal procurement of goods and services through their affiliated channels on cable TV, whereas others started publishing newsletters to inform their electorate on the progress towards procurement of various items.

One important goal of the public.net project was to take these initiatives for increased transparency in public administration a step further by extending them to other agencies and departments. In fact, almost all public procurement notices are available on the net today, through the internet sites of various agencies and organizations.

The Public.net initiative also had other goals, complementing these steps towards increased transparency with the provision of other services through the net. Despite delays resulting from lack of finances, many important steps were taken towards these goals during the past five years. In many instances where citizens seek to use government services, long and badly managed queues were the norm rather than the exception, and the lack of proper communications among various official departments required that citizens pay multiple visits to government offices. The lines are getting shorter or completely eliminated in many of the government offices thanks to various eGovernment initiatives[27] such as the one enabling on-line applications for passports.

Officials, industry experts and citizens would agree that the main obstacle preventing a faster transition to eGovernment is the lack of on-line databases that store data in a standard format to allow for effective communications between government agencies and offices, rather than the lack of initiatives for creative eGovernment application. In fact, there is an eGovernment project at some stage of development in almost every government agency or department. These projects range from computerized tracking of customs, to eEducation. One of the main challenges so far has been to put all these into use to make the life of the average Turkish

[27] In fact, the slogan used by edevlet.net, an independent supporter and promoter of eGovernment in Turkey, is "don't get in line, get on-line".

citizen easier. The completion of the MERNIS, the Central Census Management System, project is a major achievement in this respect, as MERNIS is likely to facilitate the take-off of many other eGovernment services.

The demo presentation delivered during the official inauguration of MERNIS in January 2003 offered a preview of how technology could improve the relationship between the Turkish state and its citizens. By assigning a unique record locator for every Turkish citizen, MERNIS promises to speed up all processes requiring the use of ID information of citizens. This means everything from bank transactions to compulsory military service.[28] A major advantage from MERNIS is that it allows government departments to share the same database, saving the citizens the trouble of repetitive filings and inconveniences caused by irregular forms of interdepartmental communication. Equally important, MERNIS will put an end to curfews confining people to their homes every general census day, getting rid of the need for this outdated and widely complained practice. Prime Minister Abdullah Gül said during the inauguration of MERNIS that he hoped that the project will also help improve education and health services by providing a health record of every citizen (Yagci, 2003).[29]

The following are sample eGovernment projects that are in use:

- Central Census Management System (MERNIS)
- Legislative info bank for on-line access to Official Gazette, Laws, Regulations, Circulars etc.
- On-line access to public procurement notices, invitations for tenders and bids, results of tenders and bids etc.
- Individual searches for tax payments that are due
- Payment of certain taxes and fines over internet (through the banking system)
- Filing passport applications over internet
- Checking for traffic violations over internet
- Searchable database for criminal records (for clearances that most employers require from job applicants)
- Drug distribution management for holders of public health insurance schemes

The following lists additional projects that have been launched and are at different stages of completion (Tuzun and Sezer, 2002):

Ministry of Labour and Social Security:

Social Insurance Project (for creation of an on-line database containing the records of workers and retirees covered by publicly-managed social insurance schemes)

Ministry of Finance:

GELIRLERNET (Revenues) Project
VEDOP (Tax Office Automation) Project
Legal Information System Project

[28] Tracking of financial transactions at the banks and elsewhere in the financial system is expected to lower tax evasion that has been a common practice among self-employed individuals and owners of small and medium scale businesses.

[29] Even though some NGOs expressed concern that this could lead to violations of privacy, those views did not receive popular support. It seems like the majority of population in Turkey is often so frustrated by the slow workings of government bureaucracy, they view anything to speed up these processes as welcome additions.

TAKBIS (Title Deed-Cadastre Information System) Project
National Real Estate Agency Project

Ministry of National Education:
MEB-NET (MOE Management Information System)
MEB-SIS (ILSIS, OKULSIS, PERSIS School Education Projects)
BILDEMER (Computer Aided Vocational Training) Project
Open High School Project
EMP (Educational Modernization Project)

Ministry of Forestry:
Geographic Information Systems Project

Ministry of Health
TSIM (Basic Health Statistics Module) Project
CKYM (Core Resource Management) Project
HBS (Hospital Information System) Project

Ministry of Industry and Trade
Electronic Commerce Project
KOSBILTOP (SME Information Collection Project)
KOSGEB (SME Administration Project)
KOBI-NET (SME-NET) Project

Ministry of Agriculture and Rural Affairs:
MIS (Management Information System) Project
TUYAP (Agricultural Application, Extension and Research Project)

Ministry of Tourism:
TURIZM-NET Project
TURSAB Project
Overseas Offices Automation System

Under Secretariat of Foreign Trade
IHRACAT-NET (Monitoring Foreign Trade Project)

Under Secretariat of Treasury
HAZINE-NET Project

Under Secretariat of Customs
BILGE-EDI Project
GIBOS Project

General Directorate of Highways
Road Information Network Project
Automatic Passing System (OGS) Project
Traffic Management System (TYS) Project
Emergency Communications System Project
Geographic Information System Project

General Directorate of Post and Telegraph
Remittance Cheque Collection Counter Project
OCR (Optical Character Recognition) Project

General Directorate of Turkish State Railways
Reservation and OMIS (Operational Management Information System) Pro.
CTC (Central Traffic Control) Project

Central Bank:
EFI-I, II Project
EMKT (Electronic Securities System) Project

National Data Bases Project
Turkish Airlines:
Electronic Ticketing Project

As for the rate at which these services are used, 13% of people living in Turkey used internet to access on-line government services in 2002, as compared to a meagre 3% in 2001. With 12%, the main type of use continued to be info seeking, representing a 6-times increase over 2001 (Mellor and Parr, 2002).

The short term action plan (2003-2004) of the eTransformation Turkey Project covers a large number of action items on IST in public administration. Some of them are (a) Forming teams responsible for transformation to eGovernment in public institutions n, (b) Determining the minimum information to be presented and the presentation principles on public websites, provision of the application as per Web Accessibility Initiative (www.w3.org/WAI), (c) Determining eGovernment applications and ICT inventory, (d) Determining the financing model for eGovernment applications, (e) Determining principles of interoperability and publishing a framework, (e) Preparing guides for preparation and evaluation of public ICT investment projects and determining principles and methodologies for the monitoring of these projects and (f) Determining measures for information society and preparation of the related statistics.

E.4.2. IST in health services

As stated in the contribution of Turkey to *eEurope+ First Progress Report*, "Primary Health Care Institutions Information System" for primary health care providers, and "Hospital Information System" for secondary health care providers are under development and test phase in 120 primary health care institutions and 9 hospitals under the auspices of Ministry of Health. The ultimate goals of the projects are building a network between primary and secondary health care providers and providing distant consultation and education services. Other public and private health care providers are planned to be incorporated into the system, and a committee has been set up to work on the participation of Turkey to the public health networks and databases led by the EU.

Within this framework, Health Reform Project II is currently being implemented in 23 provinces in Eastern and South Eastern Anatolia, as noted in the Pre-Accession Economic Programme 2002. Activities are carried out in the fields of primary health care education, primary health care interventions, health services and hospital management, national health accounts, the cost of diseases and cost-effectiveness, and international disease classification and computerised management and support systems are being set up.

Currently, the drug distribution management system is operational for holders of public health insurance schemes. Set up for the purpose of preventing waste and insurance fraud, the system works through a network connecting pharmacies to a central computer where purchases of prescribed drugs are monitored for each holder of public health insurance policies.

Under the short term action plan (2003-2004) of the eTransformation Turkey Project, the Ministry of Health is responsible for the following items: (a) Investigating the standards and standard development practices in health information and communication technologies, (b) Researching applications of Classification of Medical Supplies and Barcode Labelling

Standards, (c) Investigating the applications of Blood and Blood Products Barcode Labelling standards, (d) Provision of electronic health registry in first layer health institutions, (e) Researching development of the standards for modelling, content and structure of Electronic Patient Records, (f) Developing standards for patient information message communication (proposed for the development of Integrated Health Information Systems), (g) Developing standards for electronic communication of clinical and administrative data among institutions which provide and pay for health services, (h) Determining controlled medical terminology for coding clinical data that are to be included in the *National Electronic Patient Records* (i) Developing plans for application and spreading of controlled medical terminology for coding clinical data that are to be included in the N*ational Electronic Patient Records,* (j) Development of *National Case Composition Classification Systems* for inpatients and outpatients, (k) Determining Health Information Management standards for the applications of health service provider institutions, (l) Determining access control (eSignature) and confidentiality requirements of individual health information, (m) Performing Data Model Analysis for modelling health information, determination of applicability of these models and formation of contextual, conceptual and logical national health data models, (n) Determining National Minimal Health Data Sets which will be collected on individual basis, and preparation of a Dictionary of National Health Data, (o) Designing and modelling an Education Tree for the purposes of determining and covering the need for Health Information Technology Education in Turkey, and providing support for curricular programming in this field.

E.4.3. IST in educational services

One of the most significant investments that can be made to increase productive capacities of individuals is education. While the learning process has never been restricted to school education continuing instead throughout one's life, schools have always been the places where the learning occurs most intensively in people's lives before the recent advances in technology. These advances have carried the opportunities for intense learning and education outside schools. Turkey has had a relatively long and successful tradition of using radios and TV's for distant education. While the history of distant education can be traced back to the 1950s when the "Correspondence Course Center" was founded and the "School Radio" programs were started, the real push came in 1981 when TRT and Anadolu (Anatolia) University started their collaboration to create the "open university" and began offering undergraduate degree programs through TV. With more than 600 thousand students in Turkey and abroad, the open university currently has the highest enrolment in the world (see the Box below).

Box E2. Open University in Turkey

global village

Distance-Educator.com
Re-inventing distance education since 1970!

Turkey: Home of the World's Largest Student Body

Those involved in distance education in the United States tend to think that the field's epicenter is in North America. However, the largest student body in the world for a given distance education institution is not in the United States, not in China, not in India, or Australia. It is in Turkey. In 1998-1999, 650,000 students were participating in 18 different programs at Turkey's Anadolu University. At that time the World Bank recognized Anadolu as the world's largest university.

Anadolu University developed from a long history of Turkish distance education, starting in 1927 when an effort to increase national literacy was first proposed. It was met with skepticism. "One of the most important reasons for this skepticism might have been [the perception that it is] unrealistic to teach reading and writing without a teacher to a population with a 90% illiteracy rate." (See the Esmahan article referenced below.) This skepticism has continued to plague Turkish distance education efforts to the present day. Respect for its degrees comes slowly. In part this is because the university is legally required to accept any applicant who scores 105 or higher on an entrance examination, whereas traditional Turkish institutions require scores of 220. Test statistics can be misleading, said Ali Ekrem Ozkul, dean of the university's open-education department. Such tests do not reflect intellectual ability, but lack of opportunity for learning, especially in the rural, eastern part of Turkey. It is exactly that absence of opportunity that Anadolu University is charged to correct.

The Experiment Begins

In 1958, after decades of debate, the Correspondence Course Center was founded within the governmental ministry of education. It offered adult courses in technical fields requiring external examinations. By 1966 CCC was offering radio, hotel management, nutrition, typing, technical drawing, economic cooperatives, and electricity courses. In 1983 Turkey began the School Radio, a broadcast program for primary school students.

The seventies brought recognition of the need for higher education for those who cannot attend a university. The Educational Technology, Strategy and Methods Committee was organized with the goals of

- making use of instructional multimedia models and developing a contemporary distance education system

Video-conferencing from studios in Ankara provides live, face-to-face student interaction with instructors.

- creating new resources and technologies for distance education
- realizing scientific and experimental research to obtain solutions to problems
- founding the Pilot Teacher Training College.

Between 1974 and 1976, only print materials were used, expanding progressively to radio, television, cassettes, and records. A study revealed that only 12% of the students were following the radio and television broadcasts and using the cassettes. (Esmahan)

In spite of this discouraging statistic, in 1981, the push for distance education continued with the creation of Anadolu University, also known as Anatolia University.

New Levels of Interaction

In 1982 Anadolu University began its distance higher education programs under the Open Educational Faculty with courses in business administration and economics. The courses were and continue to be primarily print-based with broadcast support. Anadolu increasingly recognized the drawback of "insufficient teacher-student relationship" and instituted academic counseling which grew to facilities in 58 cities within Turkey, 14 of which have Internet connections. At these locations, students can participate in non-compulsory classes. The university has 81 administrative centers as well to serve the country's 83 provinces. Anadolu's programs also reach to Cologne, Germany, Nicosia, Cyprus, Turkistan, and Kazakhstan.

In 1995, Anadolu began to offer computer-assisted instruction. Software was developed in English, math, statistics, financial management, economics, and accounting. The software uses a tutorial mode: practice, revision, sample problems, and tests.

Still, the backbone of teaching is constructed on TV and radio programs and enriched by written and printed materials. Today Anadolu University maintains three studios, broadcasting through Turkish Radio and Television, the state's TV channel.

Since 1998, video-conferencing from studios in Ankara provides live, face-to-face student interaction with instructors. In January 1999 direct Internet, e-mail, and fax connections via satellite were started so that the students could have question-and-answer discussions with instructors.

Future plans include increasing the capacity of the TV band, more video-conferencing, and establishing a preschool teacher education.

Anadolu continues to investigate the possibility of more computer-based communication technologies to improve access and flexibility, including remote electronic classrooms, more teaching materials, and employing foreign expert

<http://tojde.anadolu.edu.tr/tojde5/articles/esmahan_txt.htm>; ●

8 February 15, 2002 Distance Education Rep

In the past two decades, Turkey has made major efforts to create an education system capable of providing young men and women with the broad range of knowledge and skills required to meet present-day job market needs.

As indicated by the Minister of Education in his opening speech of the 2002-2003 academic year, total number of PCs made available for use in primary and secondary education was 160 000. In addition, parents councils at different schools, and individual and corporate donors provided about 40,000 PCs, and the Ministry was about to make 45 000 new PCs available to schools around the country. Furthermore, as part of the efforts to increase computer literacy among teachers and staff between 1998 and 2002, 221 000 teachers and inspectors were given computer training by the Ministry of Education. While these numbers appear to be impressive, they were clearly inadequate relative to more than 12 million students and more than 450 thousand teachers at 42 220 primary and secondary schools (see Section G).

Despite this inadequacy, it must be recognised that the financial resources required to furnish so many schools with sufficiently many PCs are simply huge. Moreover, even when a sufficient number of PCs are installed in schools, they quickly become outdated due to the rapidly advancing technology, continuously requiring huge amounts to be spent.

The financing was in fact the most binding constraint preventing the integration of internet education into Turkish primary and secondary school curricula, despite several attempts since the mid-1990s Almost all of the attempts to make internet a part of the curricula were killed because of the lack of funds, combined with the slow working, highly bureaucratic, and centralised organisation of the Ministry of Education. However, almost all private schools and some larger city public schools which manage to find sponsors are allowing their students to use internet to communicate with foreign peers or conduct searches for information related to their homework. In addition, there are a lot of web sites and on-line tutorial services such as Egitim.com, okulum.com and Mef-Digital designed to help prepare students for the university entrance exam, or other equally competitive nationwide exams.

Facing severe budget constraints, the Turkish government has launched various projects aimed at improving the quality of education by means of financial assistance sought from different donors. These projects included attempts to upgrade the curricula and instructional materials, revising student achievement tests, improving the teacher training system, and increasing the research component in education. There emerged a number of policy initiatives to strengthen the education system in the country in the process.

Through one of these initiatives where the Ministry of Education collaborated with the World Bank, two hundred schools were equipped to work as curriculum laboratories, to test the new curricula and teaching materials, and 53 schools were identified as Computer Experimental Schools (CES), where information technology would be integrated with the teaching-learning process to facilitate education. The CES schools, which had had no previous exposure to information technology, were to receive computer hardware, software, teacher training and minor facility renovation where required. A special unit was created within the General Directorate of Computer Education and Services (BILGEM) in August 1992 to take responsibility for the CES project launched in November the same year.

The CES project was a part of a larger World Bank financed National Education Development Project aiming to use these 53 schools as an experimental platform to explore how far computer education can facilitate instruction and provide tools to improve both

teaching and learning. As an experimental project, CES was largely successful. It has demonstrated that information technology could be a powerful tool in the teaching-learning process, also harnessing the support of the community to make the effort sustainable over a long period of time (Schware and Jaramillo).

Within this context, the "Project for Globalization in Education 2000", represented a very important step for the Turkish educational system. Also supported by the World Bank, this project launched prior to 2000 was a move towards catching up with the developments of the information age by incorporating latest instructional technologies in each level of the education system. Through this project, new computer labs were established in 2 451 primary and secondary schools in 80 cities and 921 towns in Turkey. In each of these schools the so-called "information technology classrooms" were equipped with computers, printers, scanners, office program, courseware for computer literacy, courseware for different subjects, courseware that combine education and entertainment, electronic references, video, overhead projectors, TV, educational videocassettes, and slides. The computer companies sponsoring this project provided one year of free internet access to project schools. The people living near the schools also had a chance to use the internet during the weekends. With the success of the project, the second phase of this project was decided to be continued with 3 000 schools (Usun, 2003).

In fact, the number of schools covered by "information technology classrooms" program has reached 3500 by the beginning of 2004. The program is quite popular and demanded by schools. During 2003-2004 period, 4 000 more schools will be supplied with computers and internet access.

Although the computer-aided distance education is not widely used in Turkish higher education, there are visible attempts in that direction as well. Anadolu University in Eskisehir, for example, created a computer laboratory with 20-30 computers that are connected with a local network in 14 cities for that purpose. The idea is to enable students enrolled at Anadolu University to virtually attend to lectures given by well-known professors who teach at reputable schools in other cities in an interactive fashion.

There is also a tendency towards incorporation of web-based instruction into different programs at various universities. Some universities have already started offering on-line degree or certificate programs. For example, Anadolu University has been providing on-line self-test opportunities for its distance learners since 1998. Anadolu University has also started to offer some on-line course alternatives for its on-campus students in order to understand how feasible, effective, efficient, and appealing these on-line programs would prove to be. The university created a foundation for a "virtual" university in 1998, and began offering two-year on-line degree or certificate programs after fall 2001. Likewise, Middle East Technical University (METU) in Ankara has started several on-line certificate programs on information technology, English language, or computer skills, and Bilgi University, a private university in Istanbul, has been offering an on-line MBA program called e-MBA. Firat University in Diyarbakir has also a distance education initiative combining the broadcast time on Firat TV, a local channel, and internet sites and e-mail. Besides these, there are many serious efforts at other universities such as Sakarya University to start on-line programs (Usun, 2003).

In addition, in 1996, Bilkent University and in 2000, Istanbul University put their videoconferencing facilities in use. The Distant Learning Project (DLP) at Bilkent University, one of the leading universities in Turkey, was launched to present students with the

opportunity of taking a class from New York via a live satellite connection between the Ankara campus and the University's New York office that is equipped with interactive video conferencing capabilities.

The Higher Education Council (YOK) has formed the National Informatics Committee (EMK) to explore possibilities for facilitating academic cooperation so as to increase the efficiency of higher education through information technologies that enable the sharing of educational resources among universities. The committee essentially works towards the eventual goal of establishing a virtual university in Turkey so as to make higher education available to wider student audiences.

As ADSL infrastructure is becoming more prevalent in education, the Ministry of Education and Turkish Telecom agreed on providing ADSL connections to primary and secondary schools all around the country. According to the agreement, 20,000 schools until the end of 2004 will have broadband connections. It is planned that 42,000 schools will be equipped with ADSL connections at 512 kbps until the end of 2005, and this figure corresponds to 90% of students across the country.

Under the Education and Human Resources Development Section of the short term action plan (2003-2004) of the eTransformation Turkey Project, the Ministry of Education is responsible for implementation of the following items: (a) implementation of “Connect a School to the World” Campaign, (b) Establishment of 4000 Information Technology Classrooms at primary schools (PHASE 2) under the main project “Facilitating appropriate level of access of students and teachers to Internet and multimedia resources at schools (2003-2005)”, (c) Building a prototype of the Education Portal under the main project “Establishing an Education Portal for the purposes of providing resources, e-Education platforms, and providing online support services for teachers, students and parents including the handicapped (2003-2006)”, (d) Renewing curricula for increasing quality and productivity of education through efficient and effective use of information technologies, (e) Training of teachers for developing innovative and practical teaching applications, organizing internal training programs for increasing their skills in using new technology, (f) Performing preliminary studies and necessary arrangements for initiating public access to IT resources of educational institutions, (g) Increasing the quality of Course and Certification education, provision of equivalence of certificates and diplomas to EU Standards. In addition, for human resources development, the State Planning Organisation undertakes “Planning human resources as per the requirements of Information Society”.

E.5. IST in households

A large-scale survey designed to monitor and evaluate the accessibility and capability of users was taken in 1998 to guide the preparation of Turkish National Information Infrastructure (TNII or TUENA as abbreviated in Turkish) Master Plan by the Ministry of Transportation and Communication (MTC). The survey was the first of its kind on this scale in Turkey and intended to collect data on local characteristics of users with respect to ownership, capabilities and other social aspects, by surveying the urban household population living in the cities (as opposed to small towns and rural areas) which currently make up about 65 percent of all households.

One of the main objectives was to determine the extent of dissemination and the usage of communication technologies by family characteristics, and to use the information obtained at the household level in the formulation of national policies (MTC, 1999).

According to the survey results, 82 percent of urban homes had a telephone connection (Table E5).[30] Teledensity was around 25 per hundred in 1997, making Turkey a leader among countries of its size and rank, according to the ITU data. The most widely diffused communication technology at homes was television. More than %96 of homes had at least one television set. Internet access was available at 1.2% of all homes and 1.9% of all businesses, whereas households that owned a home computer stood at 6.5%. Furthermore, 10.1% of individuals surveyed reported to own cellular (GSM) telephones.

The survey also indicated, however, that distribution of access to ICT was not balanced among social groups. For instance, nearly 77 percent of all computers were owned by the 40 percent of households that made up the top socio-economic status groups. The lower socio-economic status groups that make 40 percent of the households owned only 10 percent of all computers. Telephone lines, on the other hand, had a more equitable diffusion among different socio-economic groups enabling widespread use of more advanced communication services than simply calling others, and hence, was accepted as a sign of capability.

Table E8. ICT Ownership in Turkey (Urban households – 1998)*

Type of ICT	*Household* ***(%)***	*Personal* ***(%)***	*Business* ***(%)***
TV	96.1	--	--
Radio	90.9	--	19.0
Fixed-line Telephone	81.8	--	53.7
Computer	6.5	--	11.3
Answering Machine	5.8	--	5.4
Facsimile	1.5	--	10.1
Internet Connection	1.2	--	1.9
Cellular	--	10.1	--
Pager	--	2.5	--

Source: MTC (1999), TUENA Survey 1998.

* The numbers in the columns show the percentage of individuals reporting the type of their ICT use in response to survey questions. So, the numbers in the last column should not be taken to imply that only 10.1% of the businesses have a facsimile, or only 11.3% of them have a computer. The numbers imply, instead, that 11.3% of individuals surveyed reported to own a computer for business use (perhaps in addition to one they have at home).

[30] While the survey did not cover rural areas inhabited by about 35 percent of Turkey's total population of 62 million during that year, even the smallest villages in the remotest areas were known to have at least one phone line.

Table E9. Distribution ICT Ownership by Socio-Economic Status 1998 (%)

Type of ICT	*Lowest 20%*	*Lower 20%*	*Middle 20%*	*Upper 20%*	*Top 20%*
Home Computer	2.9	7.4	12.4	24.8	52.5
Fixed-line Phone	13.7	19.5	21.0	22.4	23.4

Source: MTC (1999), TUENA Survey 1998.

Data suggests that not only the technologies but also the capabilities were diffused unevenly among different socio-economic groups. Nearly 60 percent of audio text services were used by higher and the highest status groups.

Gender difference turned out to be one of the main variables determining capability to use the newer ICT's. Regarding advanced information services, women used automatic wake-up and audiotext services more than men did, whereas Call forwarding and Dial-up banking services were used more by men than women. It is estimated that around 15% of the internet users are women. They mostly use internet cafes for connection. Use of internet is most common in women students (17-25 age group); then in those have access from work. (Kuru, 2000).

Table E10. The Use of Advanced Services by Socio-Economic Status 1998 (%)

Services	*Lowest 20%*	*Lower 20%*	*Middle 20%*	*Upper 20%*	*Top 20%*
Automatic Wake-up Calls	10.1	10.6	19.5	24.2	35.6
Call Forwarding	11.1	11.1	16.5	23.0	38.3
Banking Services	11.1	10.7	14.4	23.0	40.7
Audiotext Services	6.4	16.6	17.6	20.8	39.2

Source: MTC (1999), TUENA Survey 1998.

In the survey, a total of 11 questions were asked to have an idea about the eagerness of society to use the National Information Infrastructure of the future, and about the type of services for which there would be a higher demand. According to the results, urban households in Turkey intend to use the National Information Infrastructure extensively. Even the least popular service was to be used by 57.2 percent of households. The most demanded applications are likely to be citizen-government (%82.6), citizen-citizen (%73.2) and consumer-business (%73.5) relations/transactions. All of the potential services which were listed were viewed slightly higher than average by men, by the age group of 18-24, by those who have received higher education and by those who live in the Southeast Anatolian region which is the region where transportation network is less developed than others.

Table E11. Potential Demand for National Information Infrastructure Services 1998

Services	*Readiness to Use* ***(%)***	*Rank*
Finding out about and paying telephone, tax, water, etc. bills	82.6	1
Submitting petitions and receiving answers	75.5	2
Booking and receiving tickets	73.5	3
Cinema, music and other cultural events	73.2	4
Exchanging information	73.2	4
Participating in debates and votes	69.6	5
Receiving a lycée/university diploma or a course certificate	66.8	6
Access to libraries, museums and art galleries	64.9	7
Viewing and buying goods	62.0	8
Making bank and stock exchange transactions	58.5	9
Loading job applications	57.2	10

Source: MTC (1999), TUENA Survey 1998.

To sum up, the utilisation of communication technologies by the urban population was not widespread and balanced as of 1998, and the skill levels required to use ICT were not adequately developed. Yet, the intensity of interest in and high expectations about communication services were clearly visible in almost every stratum of the population. The urban population was willing to use the communication services to be provided to them by the national information infrastructure. The access gap observed in the survey was one of the major problems as also faced by other countries from the United States to the European Union. For various reasons, a part of the society was able to access new networks and sources of information through ICT, incorporating this into every aspect of daily life, while the other segments of population were staying away or getting excluded from being a part of the rapidly growing information society, thus creating a two-tiered society composed of the "information rich" and the "information poor".

The results of the survey carried out within the framework of the TUENA Master Plan study led to three major policy recommendations (MTC, 1999):

- There is a need for the pursuit of a social and economic policy to raise the purchasing power of certain low income segments so as to avoid their exclusion from the future's knowledge society.
- Regulatory mechanisms to assure universal access should be created especially for the rural population, low-income groups and for the newly arriving migrants from rural to urban areas, and the regulatory legislation should clearly specify the responsibilities of the government and the regulator for the provision of universal access.
- Communication/community centres should be set up under a separate master plan.

Even though the results from 1998 survey of the TUENA study did not produce a particularly bright picture concerning the urban population's use of the ICT in terms of the diffusion and capabilities in Turkey, they pointed to a promising future by revealing the intensity of interest in and high expectations about communication services in almost every segment of the population. Combined with the fast growth record of IST/ICT all around the world, a more recent picture of the IST/ICT environment in Turkey should be expected to be radically different than the picture based on the TUENA Survey of 1998.

In the area of Internet and PC penetration, for example, the available data indicate a strong and fast rising upward trend throughout the world, implying a global diffusion of the technology. Sweden, for instance, experienced a more than tenfold increase in internet penetration (from 5.1% to 56.4%) within the five year period from 1995 to 2000, whereas the U.S., another top ranking country, observed a sevenfold increase from 7.6% to 55.8% during the same period. Even though they are still lagging far behind, developing countries like Turkey and Romania also experienced impressive rates of increase in internet penetration, both from 0.1% to 3 and 3.6%, respectively (Guruz and Pak, 2003). So, when one looks at the results of TUBITAK-Bilten survey conducted with 5,702 individuals in 2000, significant improvements over 1998 are observed, not only for PC/Internet but also the other ICT. By the TUBITAK-Bilten survey results, between 1998 and 2000, the ICT ownership/use increased in Turkey on the average (see also the forecasts presented in Section C):

i) slightly from 96.1 to 96.9% of households in the case of TV ownership (with 4.2%, 1% and 11% of all households having a subscription in 2000 to pay-TV, digital TV and cable TV services)
ii) from 81.8 to 86.8% of households in the case of fixed-line telephone ownership
iii) from 10.1 to 46.2% of individuals in the case of cell phone ownership
iv) from 6.5 to 12.3% of households in the case of home computer ownership
v) from 1.2 to 7% of households in the case of the availability of internet access at home
vi) from 1.5 to 2% of households in the case of the ownership of a facsimile for home use.

While the rate of increase was impressive in some cases (such as cell phone ownership which more than quadrupled, and home computer ownership which almost doubled), sometimes significant variations were observed across income groups and geographic regions. For example, share of households owning a home computer is 64.7% of the total for high income group, while it is 24% for middle income and 2% for low income groups. As regards the regional breakdown, ownership rate is the highest (16%) in the most developed region, Marmara, whereas it is as low as 1.2% in the South Eastern Anatolia, the least developed region. The reasons for these variations are simply explained by the answers of surveyees to the question on the reasons for not having a computer at home. “Price not affordable” ranks the first with a share of 58.3% in total replies and is followed by “Does not have a need for one at all” (36.2% of all replies). Therefore, it is required to decrease the costs of IST while raising awareness on transformation to IS. It is expected that with the liberalisation of the telecommunication market, cost of technology will decrease and increased competition will lead to growth in IST diffusion to individuals and households (Further statistics on IST in households are given in Annex E).

Virtual Museums:[31]

The first virtual museum efforts in Turkey began in 1990 when the Topkapi Palace made an initial attempt to display some of its collections in cyberspace. The purpose of the Topkapi Palace Project was to provide easy access to such materials as photographs, engravings, orthographic drawings, animations, and so on, by means of a sophisticated interface design.

[31] This section relies heavily on Atagok and Ozcan (2001).

However, since no sponsors could be found, this multimedia system could not be completed and remained only as a CD.

In 1993, the use of internet as a medium for featuring art work began with the creation of the first art museum web site for the Istanbul Museum of Painting and Sculpture (IMPS), which was originally founded by Kemal Ataturk in 1937 (mediaccess.msu.edu.tr/services/irhm-2.5/IRHM-2.5.html). The site was one of the first in the world to use an interactive panorama format (QuickTime Virtual Reality 2) to show sixteen sculptures on display and it also featured 269 paintings in JPEG picture format.

In the IMPS project, research focused not only on how to present the museum to the world, but also on how to provide on-line information most effectively. This venture undertaken as a research project carried out at Mimar Sinan University in Istanbul was the first Turkish web museum and the first website ever created by Turkish professional graphic and multimedia designers. It captured the interest of both the specialists and the Turkish public, paving the way for art-related multimedia projects and professional website design in Turkey.

The construction of the web site for Sabanci Painting and Sculpture Collection that belonged to Sakip Sabanci, the chairman of the board of Sabanci Holding, one of the largest companies in Turkey (www.sabanci.com.tr/sergi/index_c.html) in 1996 marked the first private art collection going on-line. Although it is a simple interface design, and may be considered more of a web brochure, it has received many hits and favourable reviews. This was followed in 1997 by two other private museums, Rahmi Koc Museum (www.rmk-museum.org.tr/english/index.htm) and Sadberk Hanim Museum (www.sadberkhanimmuzesi.org.tr/english/main/frame_corporate.html). That same year, several Turkish art galleries began to show interest in the new medium. The Borusan Culture and Art Centre started to display all its exhibitions on the internet (www.borusansanat.com/e_tanitim.htm). 1997 turned out to be a productive year for virtual museums in Turkey, as it marked the opening the internet access for a number of databases. The most extensive one, called the TAY database, was begun in 1993 and was connected to the Internet in 1997 (tayproject.org/enghome.html). It displays some 2,000 artefacts found in Turkish archaeological sites in both two- and three-dimensional formats and allows users to search according to title, type, period and place.

The transformation of a simple web brochure into virtual museums was made possible with the aid of software that facilitated production of interactive, three-dimensional displays, and Turkish museums were quick to adopt them. The Department of Multimedia Design and the Department of Museum Studies of Yildiz Technical University in Istanbul initiated the research to allow viewing the Harem Rooms in the Topkapi Palace, Ataturk's Room in the Dolmabahce Palace and the Rahmi Koc Museum in QuickTime Virtual Reality format. The design incorporated orthographic drawings and interactive presentations, thus letting the user to `walk' through the museum easily by clicking on plan, section or elevation as well as on the interactive panorama.

Towards the end of 1998, the same Yildiz Technical University team created the Interactive Museum of Turkey (interactive.m2.org), based on the idea that the concept of a virtual museum does not need to be associated with an actual physical museum. The project started for the purpose of introducing Turkish art and culture within a historical process, set up virtual galleries and electronic libraries with original reference articles and published daily news about Turkish art. Exhibitions devoted to Anatolian civilisations, contemporary Turkish

artists and Turkish photography were displayed on the internet along with articles. The initiative received the support of many private corporations and the media, and was warmly welcomed by the public and by specialists alike.

The Turkish virtual museum project has thus far successfully completed a number of ventures in the following areas: 1) Web brochures that encompass general information on actual museums; 2) database, web and CD versions of museums and galleries; 3) virtual versions of actual museums, and 4) thematic virtual museums that do not exist in real life. Many of these undertakings, however, were experimental and individual attempts, conceived as academic research projects or designed for the museums of private corporations and do not include all of the state-run museums in Turkey. Nevertheless, according to a 1998 report of the European Audiovisual Observatory, the public and private sectors in Turkey have shown a growing interest in multimedia projects, and the country is considered to have one of the fastest growing fields of media and communication technologies. For this reason, it is possible to expect that the Turkish virtual museum movement will keep its momentum in the coming years, as strongly evidenced by the work started to carry 50 million Ottoman documents to the electronic environment and the internet.

E.6. SWOT Analysis

Strengths	Weaknesses
• Extremely rich and diversified media and broadcasting industry • Still low but fast rising trend for the diffusion of IST • Top notch services offered by the banking industry and financial sector • Competitive GSM industry • Significant progress towards eGovernment • Determination towards incorporation of IST into education and health • Significant progress towards the creation of legal and institutional grounds for regulatory framework • Multimedia content and software development capacities supporting applications • High level of innovation in telecommunication sector • Recently liberalised telecom market with seven private players	• Economic crisis-induced reductions in purchasing power making ICT acquisition less affordable • Still high connection charges due to recent monopoly removal in telecom • Lack of tax incentives on purchases of ICT equipment and additional taxes on GSM subscription charges • Slow movement towards adoption of IST in some areas like health • High regional disparities building upon income averages rather than lack of infrastructures • Low capacities in transferring demonstrated applied knowledge in high business developments (software industry) • Insufficient level of R&D and innovation in manufacturing industry and services sectors
Opportunities	**Threats**
• Economic growth rate picking up • Demographic transition (gradual elimination of older generations not enthusiastic about ICT) • Liberalised competitive market place for telecommunications • Implementation of the short term action plan of the eTransformation Turkey Project	• Prolonged recovery from economic crisis • Further delays in privatisation of Turkish Telecom • Political instability • The Government fails in implementation of the action plan and meeting the targets in eTransformation project

F. INSTITUTIONAL CAPACITIES AND REGULATORY BACKGROUND

F.1. Regulation/Deregulation of major markets affecting the IST industries, institutional implementation capacities

In Turkey, the economic reforms introduced beginning with the opening of a major structural adjustment package in 1980 aimed to raise the share of the private sector in economic activities and the degree of market-orientation in the economy by liberalising foreign trade, and domestic commodity and financial markets. Measures taken towards these broader goals included legal arrangements made to facilitate improved market access for private agents and to allow for the privatisation of state-owned enterprises.

The 1980s witnessed the beginning of a major overhauling of the legal system including the establishment of Capital Markets Board in 1981 to supervise the operation of financial intermediaries and stock exchanges, and full liberalisation of the capital account of the balance of payments, along with the declaration of the convertibility of Turkish Lira in 1989. Major and long-needed legal arrangements to target individual sectors, however, had to wait the 1990s and even the 2000s, when many independent boards and councils were created to oversee that economic activity in individual sectors would be in line with the efficiency improving principles of unrestricted market access, competition and respect for consumer rights etc.

Some of these arrangements could be completed only under intense pressure from the IMF, or the pressure of deadlines towards adjustment to the EU membership, as the delays were due mostly to the short-sighted re-election efforts and rent-seeking activities of the politicians elected after the 1980s as documented by such empirical studies as Sayan and Berument (1997), and Uzun (2003). Throughout the 1990s and until 2002, no political party in Turkey could confidently claim to have the support of sufficiently large sections of the electorate to come to power alone. As a result, all parties became increasingly tolerant to giving concessions to different social groups, even though making these groups better off in the short-run were not necessarily compatible with a healthy economic structure and a stable macroeconomic environment in the long-run.

Despite such rent-distribution activity, no party managed to assume power all by itself. The weak coalition governments slowed down the legislation process, by hesitating to introduce major reforms or by failing to remain in power until the reform processes they started could be completed due to frequent elections leading to immature transfers of power from one (coalition) government to the other.

The discussion in the rest of the section summarises recent developments with respect to regulation, privatisation and competition policy.

Regulatory Reform

Major steps taken towards creation of legal and institutional framework to restrict the role of the State in the economy in the 1990s and 2000s could come only after long delays. These steps helped redefine the role of the state as the entity making the rules by which private agents will act in the markets, and overseeing that they will be obeyed.

Due to the scale requirements justifying the presence of (regulated) monopolies or other special characteristics of certain sectors that made regulation an economic and social necessity, regulatory bodies have been set up. The sectors left to the control of regularity bodies included the financial markets and stock exchanges, radio and television broadcasting, banking, energy, and telecommunications (see the Table F1[32]). Furthermore, to protect the consumers against market imperfections and to prevent discriminatory practices of the companies, and competition distorting tendencies of market players a Competition Authority was set up (see the Box F1).

Regulatory bodies for the previously monopolistic markets for natural gas, electricity and telecommunications sectors were created and were given specific responsibilities to regulate the activities of companies formed through functional separation of former state monopolies (such as PTT and TEK, the state agency for power generation and distribution) to facilitate privatisation of these giant companies.

For the purposes of the present report, the most important of these regulatory bodies are the Telecom Authority and the Supreme Council of Radio and Television Broadcasting (called High Audiovisual Board in the Table F1). The Telecommunications Authority was founded as a public judicial entity on January 27, 2000 in accordance with Article 5 of Law No. 4502 amended by Wireless Law No. 2813, and became operational as of August 15, 2000. It was allocated a separate budget to assure its administrative and financial autonomy. The Authority works under the auspices of Ministry of Transportation and Communication to establish a dynamic telecommunications sector based on fair and free competition and to protect consumer rights in line with the practices in the EU (Turkiye Telekomunikasyon Kurumu, 2001).

In accordance with the Government policy in establishing a competitive market structure in the telecommunications sector to help increase service quality and number of innovative and value-added services while reducing costs, other operators can operate in every segment of telecommunications sector by obtaining a license from the Telecommunications Authority. From the date of establishment to the beginning of 2004, the Authority granted 5 licences for global mobile personal communications by satellite, 86 licences for Internet service providers, 2 licences for satellite platform services, 19 licences for satellite telecommunication services, and 7 licences for data transmission services over fixed lines.

Recent activities of the Authority includes implementation of conferences for the consumers and investors about liberalisation of telecommunications market, coordination of eSignature working groups, publishing guidelines for the appointment of conformity assessment bodies in the area of testing and certification, and issuance of second-type telecommunications licences. On the other hand, there is a need to further reinforce the administrative capacity of the Telecommunications Authority for effective operation in the liberalised market. A project has been started for this purpose with a budget of €2.3 million under the 2002 Turkey-EU Financial Cooperation Programme. €40,000 of this amount is being provided by the Turkish Government. Further information on Telecom Authority is given in Section B.

[32] The table also includes Sugar Authority and Tobacco, Tobacco Products and Alcoholic Beverages Market Regulation Authority. In both cases state monopolies are in the privatisation process. Both are among the largest and oldest sectors in Turkey. To give an idea about the scale of the sectors, there are 30 sugar factories in the country and Turkey is the third largest sugar producing country in the world (value of annual production is about €1 billion and about 2.5 million people are employed in the sector).

The Supreme Council of Radio and Television Broadcasting (SCRTB) was established in 1994 to regulate the broadcasting industry and to prevent discriminatory practices in such a way to make sure that the industry remains competitive. It is also responsible for overseeing that broadcasters comply with the rules and standards set to protect minors from pornography, extreme violence etc., to prevent mudslinging, to restrict commercial times etc.

As also discussed in Section B, an important duty of the SCRTB is to issue licences and allocate frequencies to each broadcaster but the frequency allocation process is yet to be finalised, despite the nine year-history of the council. This becomes perhaps even more surprising, if it is remembered that the major reason underlying the establishment of the Council was to put an end to the frequency chaos experienced at the beginning of the 1990s. This was when hundreds of unlicensed private radio and TV stations suddenly invaded the airwaves by renting broadcasting times from various satellite operators abroad. These companies started their operation by using a loophole in the law and without obtaining a licence, as there was no agency to issue licences. Yet, they were received with such a huge popularity that the government had to accept their existence first, and soon after, had to legalise their operation. The SCRTB could become operational only four years after the first private operators began broadcasting to audiences in Turkey, and is yet to finalise the frequency allocations. Further information about SCRTB is provided in Section F.

Table F1. A Brief History of the Formation of Regulatory Agencies in Turkey

Institution	**Law No./Year**	**Sectors**	**Task**
Capital Markets Board	2499/1981	Capital markets	Regulating and supervising the capital markets and protecting the rights and interest of investors
High Audiovisual Board	3984/1994	Radio and television broadcasting	Regulating radio and television broadcasting
Competition Authority	4054/1994	Goods and services markets (all sectors)	Preventing agreements, decisions and concerted practices, and abuse of dominant position by undertakings which hinder, distort or restrict competition in goods and services markets; facilitating the regulation and supervision to protect competition; controlling mergers and acquisitions
Banking Regulation and Supervision Agency	4389/1999	Banking	Protecting the rights and interests of depositors; laying down the principles regarding the establishment, management, operation, acquisition, merger, liquidations, and supervision of banks in order to ensure efficient operation of the credit system with due regard to the requisites of development, and confidence and stability in financial markets
Telecommunications Authority	4502/2000	Telecommunications	Constituting a dynamic and strong market based on fair competition; contributing to the sectoral policy-making process; taking measures to protect consumer rights; ensuring efficient and productive use of scarce resources in the sector such as frequency and number
Energy Market Regulation Authority	4628/2001 4646/2001	Electric energy Natural gas	Constituting a financially strong, stable and transparent energy market operating under private law in a competitive environment to provide adequate, refined, continuous and environment-friendly electricity and natural gas; ensuring independent regulation and supervision in the market
Sugar Authority	4634/2001	Sugar, starch based sweeteners	Regulating the sugar regime through establishment of procedures and principles regarding sugar production and the conditions and methods of price setting and marketing
Tobacco, Tobacco Products and Alcoholic Beverages Market Regulation Authority	4733/2002	Tobacco, tobacco products and alcoholic beverages	Regulating the procedures and principles regarding production, domestic and external purchase and sale of tobacco and tobacco products
Public Procurement Authority	4734/2002	All public institutions	Determining the procedures and principles to be applied in public procurements; examining complaints regarding all public procurements

Box F1. Competition Law and Policy in Turkey (from *Pre-Accession Economic Programme 2002*, Ankara: State Planning Organisation at http://ekutup.dpt.gov.tr/ab/kep/pep2002.pdf)

Competition Law and Policy

The ultimate objective of the Turkish competition policy is to create an efficient competitive environment in goods and services markets. Law No. 4054 on the Protection of Competition was adopted in 1994, in line with Article No. 167 of the Turkish Constitution, which assigns missions and responsibilities to the State to take and develop appropriate measures for the smooth and orderly functioning of money, credit, capital, and goods and services markets, and to prevent monopolistic or oligopolistic competition in those markets. The Law is in harmony with the EC-Turkey Association Council Decision No. 1/95.

Law No. 4054 regulates all behaviours which have as their object or effect the prevention, distortion, or restriction of competition within Turkey. The Law addresses mainly three categories of issues regarding competition policy. The first is agreements, decisions, and concerted practises which hinder, distort or restrict competition among enterprises. The second is the abuse of a dominant position by enterprises. The third is mergers and acquisitions which distort the competitive structure of the market.

The Competition Authority has adopted a considerable amount of secondary legislation to implement Law No. 4054. Preparatory work regarding the adoption of communiqués on de-minimis and R&D is continuing. As foreseen among the medium-term priorities of the National Programme for the Adoption of Acquis (NPAA), the Authority issued the Communiqué on Block Exemptions concerning Vertical Agreements in July 2002.

As referred to in the NPAA, in the fields which are not within the scope of Law No. 4054, the necessary secondary legislation will be adopted by the relevant public institutions. Draft Law on Monitoring and Surveillance of State Aid has been prepared. The draft Law aims to establish an independent body responsible for monitoring and supervising state aid, excluding aid related to the agriculture and fisheries sectors, and taking the necessary measures to prevent the distortion of competition. In addition, a working group composed of representatives of related public institutions has been established so that the competition policies applicable to public enterprises and others, to which special or exclusive rights have been granted, can be approximated to those of the EU. Over the 1997-2001 period, 1,591 applications concerning competition infringements, mergers and acquisitions, and negative clearance and exemptions were made to the Authority and 1,305 of these were resolved.

A protocol was signed on September 16, 2002 between the Telecommunications Authority and the Competition Authority in order to cooperate in enforcement of competition rules in the telecommunications sector. In May 2003 the Competition Authority imposed a record fine on the mobile telecom operators Turkcell and Telsim, amounting to €17.8 million, on grounds of abuse of dominant position due to their refusal to provide national roaming.

There is a need for the Competition Authority to be more active in promoting greater competition in regulated infrastructure sectors as well as in the privatisation process and to continue establishing cooperation with the other sectoral regulatory authorities. The Competition Authority should also be fully associated with the alignment of the EU acquis as a matter of priority since competition rules are still not effectively enforced with regards to public enterprises, state monopolies and companies having special rights (Progress Report, 2003).

F.2. Privatisation policies

The main and long-held (since the early 1980s) objective of the privatisation programme in Turkey has been to minimise the role of state and to promote prevalence of free market conditions so as to increase the efficiency and competitiveness of the economy. These objectives became even more important within the context of the Customs Union Agreement with the EU, Turkey's accession process leading to the EU membership, and more recently in the context of the stabilisation programmes implemented under IMF conditionality.

Raising revenue to help reduce the national debt stock; lowering the financial burden State Economic Enterprises (SEEs) impose on the government budget and hence, preventing the crowding out of private investment as well as increasing the efficiency in financial markets were also important benefits expected of privatisation. Systematic steps towards these goals were begun to be taken in the 1980s, but success has so far been limited.

Despite some progress, the privatisation efforts in Turkey have moved rather slowly due to the short-term political risks that they involved for policy makers, and the significant resources that SEEs provide for political rent-distribution activities, particularly as destinations of political staffing –a common practice among Turkish politicians involving the pre-election promises for and post-election provision of state employment to the bands of political supporters.

At present, there are 39 State Economic Enterprises of which 19 are covered by the privatisation programme (complete list of the enterprises in the programme is available at http://www.oib.gov.tr/portfoy/portfolio_general.htm).

As indicated in the *Pre-Accession Economic Programme 2003* prepared by the State Planning Organisation, the state has withdrawn completely from certain sectors such as animal feed, milk processing, airport ground handling services, petroleum distribution and cement. In certain sectors such as textiles, tourism, meat and fish products and maritime transportation, the decisive role of the state has been transferred to the private sector. In addition, the privatisation process of public banks has been launched and significant steps have been taken with a view to reducing state influence in the financial sector. Still, privatisation targets could not be fully achieved in 2001 and 2002.

While privatisation would lower the future financial burden of the losses generated by the SEEs on the budget and on financial markets in the longer term, the receipts from sales would be an immediate benefit. Privatisation has brought in a total of 8 billion dollars in revenue between 1985 and 2003 requiring that 11 billion dollars be spent. About 90 percent of this 11 billion dollars was expenditures allocated to the financing of companies in the privatisation portfolio in the form of capital increases and loans.

During 2000, almost 2.5 billion dollars worth of sales was finalised under the projects in the portfolio of the Privatisation Administration, including the sale of 51 percent of POAS (petroleum products distribution company), Deniz Nakliyat AS (maritime lines), and the global public offering of the 31.5 percent of TÜPRAS (petroleum refining company) shares. This offering alone brought in 1.1 billion dollars and became the largest government equity offering in Turkey. In addition, through a tender held in 2000, one of the two GSM 1 800 licences was sold to the Italian cell phone operator Aria for 2.525 billion dollars. In the period

ahead, privatisation will gradually encompass the banking sector, enabling the state will only concentrate on its regulatory role as currently observed in the telecom sector.

The Board of Directors of Turkish Telecom approved the holding strategy which envisaged the restructuring of the company through its division into two additional companies as separate legal entities. In view of this restructuring and developments in the world telecommunications markets, the market price of Turkish Telecom had once again to be revalued, and a Council of Ministers Decree regarding the revaluation of the company was issued in May 2002.[33]

As mentioned before, Turkish Telecom's monopoly was removed voice transmission ended on January 1, 2004. As stipulated by the law, other operators can operate in every segment of telecoms sector by obtaining a license from the Telecommunications Authority (TA). There are already 7 operators obtained licences in the first four months of liberalisation[34]. These operators are also the first group of companies to operate in the segments that has been held under monopoly before January 1, 2004. It is foreseen that there would be more players that provide affordable and better services while a full-fledge competition is being ensured in all segments of the market. Following the removal of monopolistic status of Turkish Telecom, widespread infrastructure of it has started to be shared with new operators at the first step. It is expected that the new operators will invest in their own infrastructures in the mid-term and this will strengthen national infrastructure at large.

Before January 2004, Internet Service Providers (ISPs) were required to obtain services from Turkish Telecom, as the owner of the nationwide infrastructure, for international connections, and this has been the most important problem for ISPs. As regards the legislative framework, there are not any regulations on ISP services and regulation in this field is provided through an ISP contract made with the Turkish Telecom. To overcome this problem, the short term action plan (2003-2004) of the eTransformation Turkey Project covers an action item on enacting the necessary laws arranging the functions, authority, responsibility and auditing of ISPs which will implemented by the Ministry of Justice in cooperation with the Prime Ministry, Ministry of Transportation, Ministry of Culture and Tourism, Telecommunication Authority, and related NGOs

With respect to the mobile operator services, there are 4 operators, two of which are in the market (Turkcell and Telsim) since 1994 and the remaining two (Aria and Aycell) since 2001. Out of the current four GSM operators, the two latest entrants merged in May 2003. With 15.7 million subscribers out of 23.4 million, the incumbent Turkcell, maintained its dominant position in the market in 2002. Mobile operators introduce their data services on GPRS networks, and mobile internet connection is believed to be a rival to traditional dial-up connections in the mid-term. As shown in Section E, the GSM market is still growing and the number of GSM subscribers has exceeded the number of PSTN subscribers in 2002 (25 million as of 2002). Penetration in mobile services has increased to 35.6% while the fixed telephony penetration rate is 27%, as of 2002. The penetration rates for access to the Internet and cable television connection are still low (each 6%). National roaming agreements have

[33] In fact, Turkish Telecom was separated from the PTT and turned into an independent company in the 1980s, as part of a restructuring effort directed toward its privatisation. This was one of the early attempts in the world to privatise an incumbent operator, and due to its success in the expansion of the basic telephone service, Turkish Telecom appeared easy to privatise for a hefty amount. Yet, for reasons discussed in greater detail in Section B, privatisation could not be completed, causing huge losses in lost privatisation revenue and delayed modernisation.

[34] List of the operators are available at http://www.tk.gov.tr/doc/lisans/KVH.html

not yet been concluded between the GSM operators. This issue is subject of a long running dispute between the operators and international arbitration is pending.

Regarding the identification of and rules and regulation for the operators with dominant position or having significant market power, Tariffs Directive is in force since August 28, 2001. Access and Interconnection Directive and Radio and Telecommunications Terminal Equipment (RTTE) Directive has been published on the Official Gazette in May 2003. However, universal service obligations and the ways in which operators are going to be supported in under-served/commercially unviable areas are still missing parts of telecommunications regulation in Turkey. The universal service is defined in current telecommunications law (Law No: 406) as "minimum service"; but the rules, structure, and financial arrangements of this procedure remain to be introduced (SPO, 2004). Under short-term action plan (2003-2004) of the eTransformation Turkey Project (see Section B2) it is planned that the Ministry of Transportation and Communications will prepare a Directive for Universal Service. After this Directive is introduced, incentives, financial grants, and other issues will have a legal basis.

F.3. Regulation/deregulation of the IST based public information and services sector, and institutional implementation capacity

In this section, regulation/deregulation and institutional implementation capacity in copyright protection, eSignature, and data protection and privacy is reviewed.

Copyright protection

In Turkey, copyright is regulated by the Law on Intellectual and Artistic Works (no 5846) that was first issued in 1951. In 1995, the Turkish Parliament approved new patent, trademark and copyright laws as part of Turkey's harmonization with the EU. The Law was amended on March 3, 2001 in order to comply with the Trade Related Aspects of Intellectual Property Rights (TRIPS) and the EU acquis as well as to eliminate problems encountered in practice. The amendments provide retroactive protection, expand the list of protected items and increase deterrent penalties against piracy. They also cover measures for protecting the rights of the owner in eCommerce operations.

On the other hand, Law on Intellectual and Artistic Works should be amended further to meet the requirements of IS, especially for regulating database protection, public lending and artists' resale rights and rental rights. Current Law protects the "original" databases for 70 years. However, since some databases are prepared by dedicating huge resources, in terms of brain power and money, even are not accepted as "original", they are subjected to *sui generis* protection rights for shorter durations like 15 years in Europe. Similar approach should be adopted in Turkey (TBS, 2002).

Turkey is not party to the twin treaties of WIPO (World Intellectual Property Organization), which provides tools for IP protection on the Internet. Therefore as a priority in copyright regulation, the process of accession to the WIPO Copyrights Treaty (for protecting author's rights on the Internet) needs to be completed together with the WIPO Performances and Phonograms Treaty and the Geneva Text of the Hague Agreement on International Registration of Industrial Designs and WIPO Trademark Law Treaty. The Ministry of Culture is initiating the first steps to adhere to these treaties. After being a party to these treaties, the

provisions, including the relevant articles for electronic copyright protection, will be enforced in Turkey.

Piracy and counterfeiting is a serious problem in the country. The level of book piracy can be as much as 90%, as in the case of English-language text books. Other common forms of piracy concern optical discs with copyright content (movies, music, software, reference materials, etc.). Internet piracy (distribution of pirated media and unauthorized public performances of audiovisual works) is also commonly encountered. Especially starting from 2000, wide range awareness raising campaigns have been implemented to fight against piracy but they have not led to any significant impact. In 2002, the Turkish Ministry of Culture and Tourism established enforcement committees in all 81 provinces of Turkey. In the first two months of 2003, 15,000 pirated materials including cinematographic and musical works and 1,505 pirated publications were detected and 19 people have been prosecuted. The fight against piracy is still not effective as suggested by the high level of infringements and the low number of court cases and sanctions applied to offenders. It is required to strengthen the administrative capacity with training and more inter-institutional co-operation between the police, customs offices and the judiciary while increasing public awareness of the illegality of piracy (Progress Report, 2003).

It is also required to increase the number of specialised courts dealing with copyright and other intellectual property rights (IPR) related infringements. There are only two specialised courts in Istanbul and Ankara. For this reason, criminal and civil courts are dealing with IPR cases and excessive delays are encountered in reaching verdicts.

The copyright regulation issue is handled in the short term action plan (2003-2004) of the eTransformation Turkey Project and the action item "Enacting a law for protection of Intellectual Property Rights in electronic media" has been assigned to the Ministry of Justice in cooperation with the Prime Ministry, Ministry of Culture and Tourism, Ministry of Industry, Trade Radio and Television Supreme Council, Turkish Patent Institute, NGOs and Related Professional Organizations.

eSignature

Draft Law on Electronic Signature (no. 5070) which is essential for increasing electronic commerce and eGovernment applications has been approved by the Parliament and published on the Official Gazette on January 23, 2004. It legalizes electronic signatures and declares Telecommunications Authority as the certification authority in Turkey. The law will be in force by July 23, 2004. It has been prepared in light of the 1999/93 EU Electronic Signature Directive and German Electronic Signature Law enacted on May 22, 2001 and UNCITRAL Model Electronic Commerce Law. According to the Law, electronic signature meeting certain requirements is considered legally same as hand written signature and is accepted as proof in legal proceedings.

In order to fulfil its tasks assigned by the Law on eSignature, the Telecommunications Authority established the "eSignature National Coordination Council". Three working groups were formed under the Council on infrastructure, information security and standards, legislative framework and regulations with participants from public and private sector, academia and NGOs. The working group on infrastructure is responsible for proposing the most convenient open switch infrastructure for Turkey by reviewing the applications in the world and by evaluating the sectoral expectations, the activities being carried out under eTransformation Turkey Project and by the private sector, the factors like international

integration, national security and technological developments. Information security and standards working group is responsible for examination of eSignature related international standards like ISO, ETSI, CEN and EESSI, and for proposing measures and standards to ensure securities of qualified certificate providers and for performing secure eSignature applications by users. Finally, tasks of the working group on legislative framework and regulations are to evaluate the eSignature Law and other legislations related with the Law and to determine the subjects that will need to be changed by specifying potential legal problems that might arise in practice. All groups are expected to finalise their reports until June 30, 2004 which will be reviewed at the meeting of the eSignature National Coordination Council on July 19, 2004.

Meantime, TUBITAK-BILTEN, Capital Market Board (CMB) and Istanbul Stock Exchange (ISE) are conducting a new project for introduction and dissemination of IST applications in the joint stock companies and intermediary institutions listed in the ISE. Through the project, electronic data transfer of financial tables and company declarations to the CMB will be provided via the Internet and this information will be broadcasted using a software application to be developed for this purpose[35]. While companies send their financial information electronically, in order to provide information security, digital certificates and electronic signatures will be used. After completing software development, management of e-identity/smart card, and training, setting up and testing will be finalised till the end of 2004. Total cost of the project is approximately €1.3 million.

In accordance with the eSignature related item of the short term action plan (2003-2004) of the eTransformation Turkey Project, Ministry of Health is responsible for determining access control (eSignature) and confidentiality requirements of individual health information.

Data protection and privacy

In spite of its obligations deriving from the EC-Turkey Customs Union, Turkey has not adopted data protection provisions yet. In addition to a law on protection of personal data, the ratification process of the 1981 Council of Europe Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, signed by Turkey in 1981, has to be completed. On the other hand, the regulation on processing of personal data and the protection of privacy in the telecommunications sector has been issued on February 6, 2004. The regulation was prepared in line with the European Parliament and Council Directive 94/46 EC, European Parliament and Council Directive 97/66 EC, and the European Directive No 2002/58 of 12 July 2002. Establishment of the legislative framework for data protection and privacy will require formation of a fully independent data protection supervisory authority (Progress Report, 2003).

A regulation on consumer protection in the field of electronic sale of goods and electronic provision of services was adopted in June 2003. In addition, studies on national information security, amendment of Law on Intellectual and Artistic Works, amendment on Turkish Criminal Code in the field of protection of individual data and felonies regarding information are being carried on (SPO, 2003).

[35] In Turkey, according to regulations of Capital Markets Board (CMB), companies (those publicly traded, brokerage houses and independent auditing companies) have to send their Balance Sheet, Income Statements and other additional financial tables to the Capital Markets Board and Istanbul Stock Exchange periodically in order to notify public. In addition, these companies have to notify public about declaration and company events that can affect their financial situation when occurred. Currently, companies send their financial tables and company declarations as printed documents, in floppy disks and by fax.

The short term action plan (2003-2004) of the eTransformation Turkey Project covers enactment of the draft law for protection of personal data. For this purpose, Ministry of Justice and Prime Ministry takes the responsibility.

F.4. Regulation/deregulation in the main services and infrastructures sectors

In this section, regulation/deregulation in telecommunications, eCommerce and media is reviewed.

Telecommunications

In Turkey, monopoly in telecommunications was removed as of January 1, 2004 and Turkish Telecom's exclusive rights on voice transmission and infrastructure expired. As stipulated by the law, other operators[36] can operate in every segment of telecoms sector by obtaining a license from the Telecommunications Authority (TA). On the other hand, achievement of the goal of full liberalisation is crucial, but the process will take time. Nevertheless, this beginning will bring along many opportunities for both companies and citizens. It is expected that full liberalization together with effective regulation will attract many other foreign investors too. Currently, providers of service, data, content, and application use the same infrastructure, and this appears to be the hardest obstacle for development new value-added services in the country. Although there are no legal barriers to be a player in the telecommunications services market lack of legislative framework makes the progress of market slow and fragile. Thus, domestic and international firms who are willing to gain access to one of the last few untapped markets in the world prefer to not to invest in Turkey (SPO, 2004).

Being a monopoly in the market for long years, Turkish Telecom has the most widespread infrastructure, which serves even to is shared with new operators at the first step. It is expected that the new operators will invest in their own infrastructures in the mid-term and this will strengthen national infrastructure at large (SPO, 2004).

The process of liberalisation and regulation of telecommunications sector has accelerated since January 2000, mainly following the enactment of Law No. 4502 and 4673. In accordance with the Council of Ministers Decree of 30 April 2003, regarding the privatisation of the Turkish Telecom, it is envisaged that the preparations for the minimum 51% block sale and international public offering of the company will be undertaken simultaneously. The decision on the selection of one of these two methods will be taken according to the market conditions.

Meantime, prior to the privatisation, efforts to increase the competitiveness of Turkish Telecom are carried out. Studies to consolidate related laws and regulations have been started to prepare framework legislation in the field of telecommunications. The new legislation on the general principles regarding the sector and provisions on operators, regulatory body and users was completed in the first quarter of 2004. A new regulation on authorization procedures and principles prepared in accordance with Law No.4673, with EU acquis and sectoral requirements was issued in February 2004.

[36] There are 7 of them already. List of the operators are available at http://www.tk.gov.tr/doc/lisans/KVH.html

In May 2003, the Regulation on Access and Interconnection was adopted in order to set out the principles and procedures for access to telecommunications networks, including interconnection, to stimulate investment in infrastructure; to provide efficiency and sustainable competition in the market; and to encourage the applications through which users draw maximum benefit from telecommunications services and networks with a reasonable price. In order to constitute basis for the regulations on interconnection, carrier pre-selection and carrier selection "Communiqué on Principles and Procedures regarding the Determination of Operators Having Significant Market Power" and "Communiqué on Principles and Procedures regarding the Determination of Operators Having Dominant Position" were adopted in June 2003 in line with the acquis.

Considering the liberalisation of voice transmission by the end of 2003, current "National Numbering Plan" has been reviewed with the aim of assigning the numbers based on fair, transparent and non-discriminatory criteria. It is also targeted that the numbering is used and monitored to ensure effective competition. Regulation on Numbering was issued on February 26, 2004

Regulation on Radio Equipment and Telecommunications Terminal Equipment was adopted in May 2003, to align with Directive 1999/5/EC on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity. With regard to the installation and use of short distance radio equipments, a draft regulation was prepared and is being deliberated by the related parties.

The regulation on Market Surveillance was issued in February 2004. Draft regulation on Certified Bodies for Radio Equipment and Telecommunications Terminal Equipment was prepared. In the framework of EU-Turkey Financial Cooperation; €4.8 million will be allocated to implement regulation on Market Surveillance and Monitoring for Radio Equipment and Telecommunications Terminal Equipment and to improve infrastructure of existing laboratories by which surveillance activities will be performed. €1.1 million will be allocated to implement the regulation on Certified Bodies for Radio Equipment and Telecommunications Terminal Equipment and to improve infrastructure of existing laboratories by which conformity assessment activities will be performed for certified body candidates.

Preparatory work continues for clearing and allocating relevant frequency bands in order to implement the Council and European Parliament Decision of December 1998 regarding the introduction of third-generation mobile and wireless telecommunications systems (UMTS). A draft law on the establishment of a Universal Service/Access Fund has been prepared in order to enable the service offerings that are under the universal service obligations to protect rights of access of consumers having physical and social disabilities, and to support the access of every citizen to information and communication via community communication centres. Regulations for the licensing of Fixed-Wireless Access (FWA), Long Distance, and Voice over Internet Protocol (VoIP) operators during the process of full liberalisation are being prepared.

In spite of above mentioned regulatory efforts in telecommunications, legislative alignment with the EU telecommunications acquis is still insufficient and further efforts are necessary especially in terms of effective implementation as cited in the Progress Report 2003. Specifically, it is required to review the legislation on universal service, leased lines and data protection; to improve implementation and enforcement of legislation on licensing and tariffs and to resolve dispute over national roaming.

The short term action plan (2003-2004) of the eTransformation Turkey Project foresees enactment of the new telecommunication law. The objective of the new law is to renovate the structure of old laws, namely Law No:406, Law No:2813, and some other amending laws, and to cover all needed areas of regulation for telecommunications market, such as interconnection, licensing, universal services and numbering, in line with the acquis. Besides a new telecommunications law, TA is required to complete the necessary legislation. In order to promote competition and regulate the market effectively, there are several important items, such as; licensing regarding VoIP, long distance telephone service, cable platform and network provision; rights of way; local loop unbundling; co-location and facilities sharing; consumer rights and accounting separation need to be completed as soon as possible (SPO, 2004).

eCommerce

The regulations in the field of eCommerce include the draft Law on Electronic Signature which has been approved by the Parliament in January 2004; the Law on Right of Access to Information and the regulation on consumer protection in the field of electronic sale of goods and electronic provision of services which was adopted in June 2003.

Although a draft law was prepared with a broader focus for regulating eData, eContract, e-Signature, certificate service providers and eSignature certificates, its scope was narrowed and limited with the eSignature. As noted by the Turkish Parliament, *without regulating eCommerce as a whole,* the Law regulates legal and technical structure of eSignature, eSignature related processes and activities of e-Certificate service providers as the main infrastructural item of eCommerce and "eGovernment" project. Although it is a positive step, it is required to handle eCommerce regulation issue with integrity and as a priority. It is expected that under the action item "Structuring of the appropriate environment for eCommerce" in the short term action plan of the eTransformation Turkey Project, necessary measures are taken and regulatory framework is established.

eCommerce related activities that were started in 1998 following the decision of the Supreme Council of Science and Technology are being carried out by the Under Secretariat of Foreign Trade in cooperation with relevant public and private organisations and NGOs. There are three implementation groups focusing on all aspects of eCommerce: (a) SMEs and other enterprises (coordinated by KOSGEB), (b) e-document for foreign trade (coordinated by the Under Secretariat of Customs), and (c) e-financial services (coordinated by the Union of Banks). The implementation groups build their activities on the studies of nine working groups (legislative framework, secure networks and smart cards-administrative infrastructure, SMEs and other enterprises, consumer issues, e-document in foreign trade, tax and accounting issues, finance and e-payment systems, eCommerce and services in public organisations and agriculture) that were active between 1998-2002.

In 2003, activities of the implementation groups include preparation of a digital registry system for firms, promotion of e-document and eCommerce, and production of eCommerce statistics. In addition, the Union of Banks coordinates working groups of eCommerce, XML, EFT and e-Money in which some pilot projects are discussed among banks to build Public Key Infrastructure in e-payment and transaction systems.

In addition to the item "Structuring of the appropriate environment for eCommerce", the following action items are planned to be completed in accordance with the short term action

plan (2003-2004) of the eTransformation Turkey Project: (a) Formation of a Corporate Registration System by the Ministry of Industry and Trade; (b) Informing and increasing the awareness of SMEs about eCommerce and e-business by KOSGEB; (c) Providing eCommerce preparedness evaluation services to companies by KOSGEB; (d) Formation of a joint eCommerce information pool as a portal by the Under Secretariat of Foreign Trade; (e) Online sharing of information and documentation used in foreign trade by the Under Secretariat of Customs; (f) Provision of international exchange of e-Documents in foreign trade by the Under Secretariat of Foreign Trade, and (g) Increasing the utilization of e-document applications in foreign trade by the Under Secretariat of Customs.

Media

In Turkey, radio and television broadcasting services are regulated by the Radio and Television Supreme Council in accordance with the Law on the Establishment of Radio and Television Enterprises and Their Broadcasts (no. 3984) of 20 April 1994 and amended on May 21, 2002. The law deals with matters relating to radio and television broadcasts transmitted by any and all techniques, methods or means and by electromagnetic waves or other means under any denotation for reception domestically or abroad.

The Radio and Television Supreme Council was established as an autonomous and impartial public body. Its main duties comprise (a) issuance of broadcasting permits and licenses to applicants who have complied with the prerequisites; (b) allocation of channels and frequency bands, with due respect to the use on a time sharing basis and in keeping with regional balances of at least 50 percent of the channels and frequency bands included in the national, regional and local frequency plans, (c) issuance of establishing and operating permits to radio and television enterprises for transmitting facilities to cover broadcast service areas allocated to radio and television enterprises according to national frequency plans for national, regional and local broadcasts and supervision of the compliance of the facilities with the provisions of the Radio Communication Law and with the prerequisites for such facilities.

The Council is also responsible for issuance of licenses for the construction and operation of telecommunication facilities so that, in addition to the radio and television transmitters provided for in the national frequency plans and to the existing telecommunications network between stationary and mobile transmitting units, radio and television enterprises can establish radio link stations for the purpose of linking up with satellites in order to relay their national and local broadcasts, on condition that these are used solely for the objectives set forth, and to verify that these facilities are operated in keeping with the provisions of Radio Communication Law No. 2813 of 5.4.1983.

F.5. SWOT Analysis

Strengths	**Weaknesses**
• Significant progress towards the creation of legal and institutional grounds for regulation and maintenance of competition • Removal of Turkish Telecom's monopolistic status • Dynamic private sector (7 firms entered in the market in the first 4 months of liberalisation)	• Slow movement towards privatisation • Slow operation of regulatory bodies due to the time spent on creation of institutional set up • Insufficient regulations in IST based public information and services sector (especially on eCommerce, data protection, copyrights) • Insufficient legislative alignment with the EU telecommunications acquis • Need to improve administrative Telecommunications Authority • Need to fight against piracy and counterfeiting by strengthening the administrative capacity with training and more inter-institutional co-operation between the police, customs offices and the judiciary while increasing public awareness
Opportunities	**Threats**
• Competition in telecom • Completion of frequency allocation to broadcasting companies and non-profit radio stations • Implementation of the short term action plan of the eTransformation Turkey Project	• Further delays in privatisation of Turkish Telecom • Political instability • The Government fails in implementation of the action plan and meeting the targets in eTransformation project

G. EDUCATIONAL SECTOR, LABOUR FORCE SUPPLY, TRAINING IN IST-RELATED SUBJECTS

G.1. Achievements in secondary and tertiary education

Table G.1. Enrolment at primary and secondary schools (in thousands)

No. of Students in Primary and Secondary Education	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Primary Schools[1]	6 862	6 879	6 708	6 526	6 467	6 403	6 389	9 084	9 609	10 028
General Secondary (Junior High) Schools[2]	2 109	2 117	2 243	2 303	2 319	2 296	2 270			
General High Schools[3]	799	894	991	1 078	1 156	1 201	1 158	1 166	1 283	1 387
Vocational Secondary (Junior High) and High Schools[4]	900	977	1 066	1 142	1 251	1 311	1 333	964	998	916

Source: State Institute of Statistics.
[1] Grades 1-5 until 1997; 1-8 after 1997
[2] Grades 6-8 until 1997
[3] Grades 9-11
[4] Grades 6-11 until 1997; 9-11 after 1997

After the reform of the education system in 1997 (see more about this in section G.2.) the number of pupils attending primary schools increased steadily (see Table G.1.).

General high schools are educational institutions that prepare students for institutions of higher learning. They implement a three-year program over and above basic education, and comprises students in the 15-17 year age group. *Vocational and technical high schools* provide specialized instruction with the aim of training qualified personnel. The organization and periods of instruction of these schools are different. Some of them have a four-year program in which case the schooling age is 15-18. The number of students attending general high schools has been increasing during the 1990s. The number of students attending vocational high schools decreased after the reform in education in 1997. From 1997 onwards the years spent in vocational high schools decreased from the 6 years previously spent in these schools.

The number of boys attending education is higher in all levels of the observed education institutions, in both public and private institutions (this can been seen from the data of the 2000-2001 academic year, in Table G.2.).

Table G.2. Education indicators by levels of education in 2000-2001 Academic Year

Level of Education	Number of Schools	Number of Students			No. of Teachers
		Total	Boy	Girl	
PRE-SCHOOL EDUCATION	*8 996**	*228 503*	*120 428*	*108 075*	*12 265*
Public	*8 297**	*212 272*	*111 906*	*100 366*	*10 901*
Private	*699**	*16 231*	*8 522*	*7 709*	*1 364*
PRIMARY EDUCATION	36 047	10 289 233	5 520 004	4 769 229	345 001
Public	*35 329*	*10 102 965*	*5 417 126*	*4 685 839*	*330 811*
Private	*718*	*186 268*	*102 878*	*83 390*	*14 190*
SECONDARY EDUCATION	*5 967*	*2 128 957*	*1 240 579*	*888 378*	*134 815*
Public	*5 485*	*2 070 899*	*1 208 386*	*862 513*	*126 216*
Private	*482*	*58 058*	*32 193*	*25 865*	*8 599*

***** Number of classrooms
Source: Ministry of Education

Table G.3. Number of applicants for the Student Selection and Placement Examination and those placed in programs of higher education 1999-1999 (in thousands)

No. of Students	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Number of those placed	196	200	260	414	371	384	412	445	426	414
Number of applicants	893	877	980	1 155	1 250	1 265	1 399	1 350	1 360	1 479

Source: Student Selection and Placement Center (OSYM).

The student selection and placement system between 1981 and 1998 was similar to the present one. The only notable difference was that the earlier system consisted of two stages: **The Student Selection Examination (ÖSS)** and **The Student Placement Examination (ÖYS)**. The second stage was administered approximately two months after the first.

The application procedure, organization of the examination, the first stage of the examination, that is the **Student Selection Examination (ÖSS),** ranking preferences for higher education programs, the placement system, handling of the special cases, and methods of item development were basically the same as those of the present system.

The second stage of the examination called **The Student Placement Examination (ÖYS)** was administered in the second half of June, and served two purposes: Selection and placement. A five-test battery was used for this purpose, including a natural sciences test, a mathematics test, a Turkish language and literature test, a social sciences test and a foreign language test. Though a five-test battery was used in **ÖYS**, the candidates had the opportunity to take only three of those, including the test on Turkish Language and Literature which was compulsory for all candidates, if their choices of higher education programs were all in one of the following three broad areas: science and engineering, economic and social sciences, and foreign languages and literature. The opportunity was due to the fact that, only the scores on the three closely related tests out of those five were considered in calculation of the weighted composite score used in the selection and placement decisions to higher education programs in each of those broad fields. The candidates whose preferences covered all three broad areas had to take all the tests.

Taking the rather high correlation between the first and the second stage results, The Higher Education Council decided, at the end of 1998, that the following years' examinations should comprise one stage only. That is, the second stage of the examination should be discontinued and only the first stage examination's results should be used in selection and placement of students for higher education in the country, starting with the 1999 administration.

Beginning with the 1999 administration, the entrance examination system is essentially based on a one-stage examination, namely the **ÖSS** of the previous system. The present system shares many aspects with the earlier one. The application procedure, organizing the examination, ranking preferences for higher education programs, the placement system, special cases and test structure and item development are all carried out in a similar manner. The details of the basic features of the past and present systems are given in this section.

As it was in the years between 1981 and 1998, every year the bulk of the students for undergraduate programs of the universities (i.e., those admitting students with a high school diploma or its equivalent) are selected and placed by a centrally administered examination system.

The basis of this system is The Student Selection Examination (**ÖSS**), and the organization responsible for its administration is The Student Selection and Placement Center (**ÖSYM**), which is affiliated to The Higher Education Council (**YÖK**).

In Turkey, as in most other countries, the demand for higher education far exceeds the places available (see, Table G.3.). In view of this fact the basic aims of **ÖSS** are two: Firstly, to assure a balance between: (a) the demand for higher education in general and in individual higher education programs and (b) the places available in higher education institutions. And secondly, to select and place students with the highest probability of success in all the available higher education programs, taking into consideration their preferences, and performance on **ÖSS**.

G.2. Reforms in secondary and tertiary education

The most significant education reform over the past several decades was the increase in the duration of compulsory primary education in 1997.

Prior to 1997, the compulsory primary education in Turkey was 5 years, with about 90% compliance rate (see Table G.4. below). Five years of compulsory education was followed by three years of middle school education and by three years of high school education, and attendance to each type of secondary schools was optional. The duration of middle or high school education could in some cases be extended to four years with the addition of a prep year, as typically was the case for private and public schools where courses are taught in English, German or French. In addition, students might have chosen to attend vocational middle and high schools, as well as general purpose vocational middle and high schools.

In 1997, eight years of uninterrupted primary education was adopted as minimum universal period of compulsory education through the enactment of Law No. 4306 which became effective all over the country after being issued in the Official Gazette on 18.8.1997. The growing trend of compliance continued even after the duration of primary education was extended, increasing to almost 98% (Table G.4.).

The transition from 5-years to 8-years of primary education involved abolition of the entire middle school system, placing a substantial financial burden on the Ministry of Education. To finance the additional expenses to be incurred for completing the transition, new taxes were imposed on purchases of many goods and services from gas and automobiles, to purchases of lottery tickets and cell phone usage. Tax provisions were initially put in place to cover the period between September 1, 1997 and December 31, 2000 but later the duration was extended by the Parliament's legislation of Law No. 4702 until December 31, 2010 to raise the funds required to finance secondary education.

As indicated in the conclusion section of the World Bank's PEIR Report "Performance Improvement in Education" has been achieved mostly through the financial support provided by the revenues raised by the legislation of new taxes through Law No 4306. "This success has been achieved by a calculable budget planning and management after the Ministry of National Education had been authorized to create resources and to make budgets. These principles and the experiences gained shall lead to more comprehensive reforms in national expenditure management."

In 2000, Ministry of Education introduced the "Project 2000 for Globalization in Education" (see also Section E) to modernize Turkish education system by putting additional funding into use to achieve the following targets regarding compulsory primary education:

- reaching an enrolment rate of 100 percent
- gradually ceasing the practice of combined classrooms
- gradually reducing the maximum number of students per classroom to 20
- replacing the two shift education with single shift education
- improving the overall quality of education

To achieve these targets, plans have been made to:

- increase the number of schools and teachers
- to increase the scope of bussing in primary education
- increase boarding capacities of boarding schools
- to meet all school-related expenses of the materially deprived students
- to modernize physical infrastructure of schools, and equipping classrooms with educational tools and materials.

G.3. Evolution and trends in secondary and tertiary education

As of 1999-2000 academic year, the enrolment ratios reached 9.8% in pre-school, 97.6% in primary education, 59.4% in secondary education (22.8% in vocational technical secondary education and 36.6% in general secondary education), 27.8% in higher education (18.7% of which being in formal education). The following table shows estimated developments in the number of students and enrolment ratios by 2005.

Table G.4. Quantitative developments in education

	1995-1996		2000-2001		2000-2005*	
Level of Education	No. of Students ('000)	Enrol. Ratio (%)	No. of Students ('000)	Enrol. Ratio (%)	No. of Students ('000)	Enrol. Ratio (%)
Pre-School Education	*199*	*7.7*	*228*	*9.8*	*690*	*25.0*
Primary Education	*9 564*	*89.8*	*10 289*	*97.6*	*10 328*	*100.0*
Secondary Education	*2 223*	*55.0*	*2 218*	*59.4*	*2 886*	*75.0*
General Secondary Ed.	*1 277*	*31.6*	*1 324*	*36.6*	*1 539*	*40.0*
Voc.&Tech. Secondary Ed.	*946*	*23.4*	*805*	*22.8*	*1 346*	*35.0*
Higher Education*	1 226	23.8	1 492	27.8	2 002	37.3
Formal Education	*766*	*14.9*	*1 006*	*18.7*	*1 519*	*28.3*
Distance Education	*460*	*8.9*	*486*	*9.1*	*483*	*9.0*

Source: Ministry of Education (http://www.meb.gov.tr/stats/apk2001ing/Section_5/1CurrentSituationin.htm)

* Estimate

** Including Graduate Students

*** Students enrolled in Open University (see Section E)

G.4. Domestic and international mobility of scientific personnel

Box G.2. From "'Brain Drain' from Turkey: Survey Evidence of Student Non-Return," by A. Tansel and N.D Gungor, November 2002 (http://yogm.meb.gov.tr/braindrain.htm)

Conclusions

This paper has provided an evaluation of the findings of a survey conducted during the first half of 2002 on the return intentions of Turkish students studying abroad. To summarize, the majority of Turkish students responding to our survey are single, male, studying in the engineering and technical fields, holding a degree from a university in Turkey with English instruction, and having parents who are highly educated. The most cited reason for studying abroad is the perception that a better quality education will be received at the foreign institution of study, based on the institution's reputation, ranking of the program or the presence of an academic thesis supervisor in the case of master's or doctorate level students.

The most important reason for not returning or delaying return appears to be the uncertainty created by the February 2001 economic crisis, which has also hit the educated segment of the population. These students fear that they will not be able to find employment upon their return to Turkey and have chosen to stay abroad for a while to acquire some work experience. More than half the respondents cited economic instability and uncertainty as an important push factor. Thus, the economic crisis combined with existing problems of unemployment or underemployment in certain fields appears to have prompted many students to seek either jobs or study opportunities abroad.

The increasing demand for these types of graduates in the United States has made the US a popular destination for recent graduates, although the job market is beginning to tighten in the US. The surprising result is that lower income levels, which is among the most often cited reasons for brain drain from developing to developed countries, appears to be less important than other "push" factors such as bureaucratic obstacles. Higher income in the host countries also does not appear to exert as great a "pull" as opportunities for advancement in the chosen occupation or for further development and training in specialization. This emphasis may be due to the higher number of doctoral level students answering the survey.

Respondents who have chosen to include comments into the questionnaire have given us some important clues with regard to the decision to return or not return to Turkey. Compulsory military service has been given both as a "push factor" in the decision to go abroad and as a reason for non-return. A considerable number of male respondents have indicated "delaying compulsory military service" as a reason for pursuing an overseas degree. Those who have not completed their military service regard long-term military service as an "interruption" causing a "time loss" in education and career. As a result, many go abroad or delay returning in order to fulfil the requirements of short-term military service. For some of these students, this constitutes the first step toward settling in a foreign country, since it means that they are starting their professional careers abroad and adapting to life and work conditions in their country of work. As well, some of those who have entered into working life abroad delay returning to Turkey because they fear the uncertainty of finding employment. Many respondents have cited the unfavourable conditions created by the February 2001 economic crisis as an example.

Several students who have settled abroad, or who plan to, say that they will continue with their lives abroad without cutting their ties to Turkey and act as a sort of "cultural bridge" between their native country and their country of destination. This indicates that although the return potential for these individuals may not be very high, their value as both cultural diplomats and mediums for information and technology transfer between Turkey and their resident countries should make them an important target group for Turkish policymakers. Turkish academic advisors abroad, for example, help ease the transition to a foreign university for many students.

In Turkey, the academic brain drain appears to be particularly troubling, since the number of universities in Turkey has grown rapidly over the last decade in response to the growing social demand for higher education created by demographic pressures. This has created the problem of staffing the newly formed universities. While the compulsory academic service requirement of government-sponsored overseas scholarships was planned as a way to meet part of this need, none-returning scholarship recipients have become a major concern. One of the most common views expressed in the survey by government-sponsored research assistants is the perceived lack of value given to science and to academics in Turkey. Some respondents have indicated that, as a result of this, they fear they will find themselves in an "unproductive environment" if they return to Turkey. Others have stated that "there is a point where money is no object" and that they would be willing to work for lower wages in Turkey

provided that they are "valued and respected".

Have the state investments in higher education, through the national scholarship program, gone to waste? The number of returning students is not the best measure to assess this. Even if all of the government-sponsored students were to return, there is indication that the advanced overseas training they received will not be put to efficient use, especially in the newly-established state universities that lack facilities, equipment and other important resources. Several government-sponsored research assistants have expressed the fear that they will be devoting most of their time in teaching activities at the undergraduate level with little opportunity to do research and develop their knowledge. The current needs of the expanding higher education system seem to be favouring a teaching role for the returning government-sponsored students, and this has led to some disillusionment and lack of motivation among the scholarship recipients. The Higher Education Council has also begun to question the value of sending so many students for overseas studies. As a result, the number of YÖK scholarship recipients has been reduced, and greater emphasis is currently placed on producing new academicians internally through the graduate programs of the established universities in Turkey. However, this requires that a greater amount of resources be devoted to the development of graduate programs. In turn, a greater amount of public investment in higher education is required if undergraduate programs are not to be compromised by a shift of teaching staff to graduate level studies.

In general, students pursuing university degrees abroad appear to be satisfied with academic and economic conditions but indicate that they find social life "lacking". In spite of this dissatisfaction with social life, nearly a quarter of all respondents are not considering returning to Turkey. One third of those who are considering returning to Turkey are planning to do so within 2 to 5 years, and another third are planning to do so within 5 to 10 years. There is a high probability that delaying return could in time come to mean "no return". Taking this fact into consideration, one could surmise that the number of students who will never return to Turkey could reach significant proportions.

The recent brain drain from Turkey should not be looked at solely in terms of an employment problem created by the conditions of the economic crises and ensuing uncertainties. Turkey must take seriously the need to develop and expand research and development activities and create opportunities for the transfer of skills and training for which so much investment has been undertaken. What is promising is that a great number of survey respondents have indicated their willingness to return even if some progress is made toward creating the right environment for research and better career development opportunities. The current article addressed the return intentions of Turkish students who are continuing with their overseas studies. The original study also includes a separate survey of Turkish professionals working abroad. Many of the respondents of this second survey are also part of the student non-return phenomenon, and their answers, we believe, will serve to expand our understanding of why Turkish students are not returning. This study is under progress and it will help us test some of the theoretical arguments put forth in several studies, such as on-the-job training as a cause of brain drain (Chen and Sue, 1995). Another important group to look at is students who have returned; further research could also be done in this area to gain even better understanding of the Issue.

G.5. ICT-related education

G.5.1. ICT-related Education: Enrolment

No information was available about total current enrolment in computer science and computer engineering departments, and computer technology vocational schools at more than 70 universities in Turkey. The membership of the Chamber of Electrical Engineers made up of electrical, electronics and computer engineers currently stand at 28 000.

G.5.2. ICT-related Education: Institutional Resources

Basic ICT training in Turkey has now penetrated primary schools, with the financial aid of the World Bank. One of the aims of the currently running Basic Education Project of the World Bank is to improve basic education quality in Turkey, which will support in-service training for teachers, inspectors, and school principals, provision of textbooks and educational materials for basic education schools, and provision of hardware, software, and training for information technology in basic education schools. The initial credit worth U.S. $300 million has been used by the Ministry of National Education to set up in 2802 schools ICT classrooms, equipped with personal computers, servers, printers, peripheral equipment, educational software, anti-virus software, overhead projectors, television sets, and various necessities such as cabinets, diskettes, fire extinguishers and waste cans. The first phase of implementation focused on establishing ICT classrooms in at least 2 schools in each district of the 81 provinces, resulting in 3188 classrooms in total.

The allocation of this computer equipment has been established on the basis of student numbers per school. Ten computers were supplied to schools with up to 400 students, 15 to schools with 401 to 800 students, 20 to schools with 801 to 1200 students, 30 to schools with 1201 to 1600 students, 40 to schools with 1601 to 2000 students, 45 to schools with 2001 to 2500 students, and 60 computers to schools with more than 2500 students.

According to a study conducted by **the Centre of Information Technologies of Education, Lithuania** (http://www.ipc.lt/english.htm) in Şanlıurfa, Ordu, İstanbul, Tekirdağ and Ankara**,** the most common difficulties reported in schools in Turkey are listed below:

1. the number of computers in schools are not enough, given the number of students,
2. the number of teachers to facilitate ICT training is gravely insufficient,
3. school administrations lack the financial resources needed to fund Internet connections, even though this should be a top priority for accessing and sharing information,
4. maintenance and technical support are costly, and schools are in dire need of guidance in these matters,
5. and finally, the inconsistencies of the current curriculum undermine any ICT investment before full potential is met.

See Annex G. for the experience of 11 schools in the before mentioned regions.

The most common problem in accessing the Internet appears to be financing these projects. Telephone lines are relatively expensive, and the additional burden of Internet access becomes an enigma for school administrations. The costs differ with the size of the school, and some of the more prosperous areas have the situation under control with the financial aid of the parents, but the numbers are usually around $200 per month. In addition, the modems in the ICT laboratories are often near obsolete, which renders Internet connections troublesome.

ICT classrooms are scheduled for 2 hours per week for each class, starting from fourth grade to eighth. This standardized schedule enables each student to continuously attend ICT lectures. As the classrooms are crowded and the number of computers is limited, 2 or 3 students share a computer. A rough calculation in this study indicates a ratio of 60 students to a computer.

Educational software and language programs cannot be used, as they are either incompatible with the curricula, or the hardware is gravely insufficient to execute them smoothly. The additional problem is the fact that the ICT labs are usually full to their capacity, and teachers can hardly find time to use the facilities for their own subjects.

The greatest deficiency for the teachers is the absence of continuous technical and contextual support. In case of a breakdown, the teachers often find themselves in a situation they cannot evaluate. The basic training of Microsoft Windows operating system and the Microsoft Office packages nearly always results in repetition, which is another obstacle in meeting the full educational potential of ICT.

The roles and functions of teachers in the ICT classroom has not changed due to the traditional instruction methods used. The students are still taught through verbal instruction, and do not have the chance of autonomous hands-on execution of ICT possibilities. Moreover, as the curriculum undergoes frequent changes, the available software becomes insufficient, and the teachers are limited in terms of exploration possibilities.

The encouragement of ICT opportunities in schools actually depends on the administrators' volition. Some schools open public courses that reward the participants with a certificate, while others do not even consider such projects. The encouragement of the society is limited, mainly because of the general technological deprivation of the public. Still, the main demand for the ICT courses in primary schools comes from the unemployed youth who are interested in improving their career chances. Parents demonstrate great enthusiasm to schools equipped with ICT, as they clearly prefer those institutions for their children. Although the parents' awareness or knowledge of ICT potential is limited, common sense dictates this basic training as an inevitable component of education.

The main differentiation between urban and rural areas in ICT opportunities appears in the attitudes of students. Urban students with relatively more access to ICT equipment via Internet cafés are more advanced in ICT use, whereas the rural students suffer from near total deprivation. The ICT project has empowered these unfortunate students with familiarity with and competence in ICT. Urban schools have done the same for the teachers, who usually remain distant to technology.

Common hardware problems encountered in schools are usually connected to maintenance difficulties. Without the necessary technical knowledge, breakdowns are difficult to deal with. Administrators face difficulties especially once the warranties of their ICT equipment expire. Always juggling various problems with limited financial resources, ICT maintenance becomes an extra burden for principals. The lack of projection systems also has a considerable impact on the instructors, as overhead projectors that have been supplied are not adequate for basic computer training. ICT classes are either arranged in the traditional rows, or the Semi-circle. Recently the Ministry of National Education has requested the schools to use the traditional arrangement, much to the disadvantage of the teachers. The Semi-circle enables the instructor to monitor all activities at a glance, whereas the classical setup obstructs communication in class.

There are practically no gender variations in students' ICT abilities, although the male students are reported to be more enthusiastic, and the females more timid. Still, the skills obtained during basic ICT training show no variance between sexes.

Perhaps the most prominent problem encountered in ICT education in primary schools is the lack of technically proficient staff. Neither local education authorities nor schools themselves can supply the much-required support, and ultimately the teachers are left on their own to handle the various situations. This absence also affects the training process, as teachers are not equipped with necessary skills to broaden the facilitation of ICT. Such support staff could not only act as technical advisors, but could also train teachers and act as formators.

G.5.3. ICT - related Education: Output

Starting from the 1990s, Ministry of Education began to spread formal computer education to secondary education by opening computer departments at so-called vocational high schools which have traditionally offered high school degree programs to train electricians, mechanics and other technical support personnel in such fields as electronics, construction and wood processing. There currently are 56 vocational high schools, each offering three different types of high school degrees after training their students to become technical support personnel in the field of computing (see the list in the Annex TableG5).

As far as computer departments are concerned, "Anadolu Meslek Lisesi" degree is the high school degree obtained after completing a programming-intensive program where most of the classes are taught in a foreign language (typically English), whereas "Meslek Lisesi" degree is the equivalent of this except that the classes taken towards the degree are taught in Turkish. "Endustri Meslek Lisesi" degree, on the other hand, is the high school degree obtained after completing a program with a focus on computing hardware and equipment.

G.6. SWOT Analysis

Strengths	**Weaknesses**
• Completion of the transition to 8 years of compulsory education and high enrolment rate at the primary school level • Large unsaturated market for ICT applications in education • Open University • Solid, high quality education at secondary and tertiary levels in ICT related fields	• Lower enrolment rates at secondary and tertiary education relative to primary education • Large student body requiring substantial financial resources to educate • Gap between demand and supply for higher education including ICT related fields
Opportunities	**Threats**
• As economic growth rate picks up: Resulting reductions in unemployment and increased household incomes will make financing educational expenses more affordable for poorer families; increased tax revenue will generate new funds for financing public education projects • Reductions in debt stock and debt servicing to make larger amounts of funding available for education.	• Prolonged recovery from economic crisis to suppress public funding to education for extended periods of time • Brain drain

H. NATIONAL AND REGIONAL DEMOGRAPHIC DATA AND PROSPECTS

H.1. Age distribution

Turkey has a relatively young population as the age composition of population given in the table below indicates. 55% of the population is below the age of 25, and 85.77% is below 50.

The overall dependency ratio defined as the ratio of population in 0-19 and 65+ age groups to the working age population between 20-64 is almost equal to 1. The young age dependency ratio defined as the ratio of population in the ages of 0 to 19 to the population between 20-64 is 0.92, whereas the old age dependency ratio defined as the ratio of population older than of 0 to 19 to the 20-64 population is 0.08.[37]

Table H.1. Population shares by age groups, 1997

Age Groups	%	%
00-04	10.54	
05-09	12.22	
10-14	12.20	55.00
15-19	11.01	
20-24	9.02	
25-29	8.52	
30-34	7.24	
35-39	6.18	30.77
40-44	4.94	
45-49	3.90	
50-54	3.58	
55-59	3.44	
60-64	2.86	12.60
65-69	1.76	
70-74	0.97	
75-79	0.78	
80-84	0.47	1.26
85+	0.01	

Source: State Institute of Statistics.

H.2. Population dynamics

This young population profile is due to the rates of population growth, which remain high despite a steady decline over the past decades (see the table below). Demographic projections indicate that the reductions in population growth rate will continue until the middle of this century when the population of Turkey will stabilize at around 99 million (TUSIAD, 1999).

[37] On account of the fact that some studies take the lower bound of working age in Turkey as 15, the relevant value of overall dependency ratio could be taken as 0.64, which is even lower.

Table H.2. Annual population growth rates, 1990-2002

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1.97	1.94	1.91	1.88	1.85	1.83	1.81	1.79	1.75	1.71	1.66	1.61	1.57

Source: State Institute of Statistics.

Given these population growth rates, the ratio of population between ages 0-14 decreased from 32.8% in 1995 to 30.0% in 2000, whereas the ratio of age groups 15-64 and 65 + have increased (Table H.3.).

Table H.3. Changes in age composition

	1995	2000*	2005*
Distribution of population by age groups			
0-14 Age Group (%)	32.84	30.04	28.27
15-64 Age Group (%)	62.13	64.39	65.84
65+ Age Group (%)	5.02	5.57	5.89

Source: Ministry of Education
*** Estimate.**

With the share of 15-64 age group in total population currently reaching 65%, Turkey is now entering its demographic window of opportunity defined as the period during which the productive age groups' share in a nation's population is at its highest. This window for Turkey is expected to last until 2025, with population aging setting in and the share of productive age population gradually declining thereafter. If Turkey could complete structural reforms and place its economy on a sustainable growth pate with growth rates that are sufficiently high to create employment for these generations in high value-added sectors, the next two decades or so are likely to be the periods of an unmatched boom in social welfare. The challenge before Turkey therefore is to make the best out of this opening window of opportunity by providing quality education and job opportunities to upcoming cohorts of working age populations in a competitive and efficiently working economy that is well-integrated to the rest of the world (Sayan, 2001). This, however, is not an easy challenge to meet as briefly discussed in the next section.

H.3. Main economic and social effects of population dynamics

Population growth rate began to fall but 37.3 million people making up 57% of the population still belong to 0-24 age group.

Table H.4. Changes in shares of school age population

	1995	2000*	2005*
3-5 Age Group (%)	*6.36*	*5.89*	*5.89*
6-13 Age Group (%)	*17.98*	*15.85*	*14.63*
14-16 Age Group (%)	*6.60*	*6.29*	*5.53*
17-20 Age Group (%)	*8.15*	*8.28*	*7.68*

Source: Ministry of Education
*** Estimate.**

In 2000-2001 academic year, there were 15 820 534 students and 543 277 teachers at pre-school, and primary and secondary schools plus universities implying that about 25% of population were students at schools.

As discussed in Section E, Turkey has made significant attempts to create an education system capable of providing young men and women with the broad range of knowledge and skills required to meet present-day job market needs, over the past two decades. As also discussed in that section and Section G.1., hundreds of thousands of PCs were made available to schools, and 200 000 teachers and inspectors were given computer education by the Ministry of National Education. While these numbers appear to be impressive, they were clearly inadequate relative to more than 12 million students and more than 450 thousand teachers at primary and secondary schools. This inadequacy is due, more than everything else, to the substantial amounts of financial resources required to furnish so many schools with sufficiently many PCs and keep them updated.

Another issue preventing Turkey from taking full advantage of its demographic window of opportunity is relatively low labour force participation rates as discussed in Section E. This implies that to be able to take full advantage of its demographic endowments, Turkey has to increase labour force participation rates, and create employment not only for the coming generations but also the present ones. Naturally, the first pre-condition for that is to create a stable macroeconomic environment and to curb the growth in budget deficits by putting an end to short-sighted populist rent distribution out of public sources. When taken, these steps will not only make Turkey and its large domestic market an attractive destination for FDI flows but will also promote domestic investment by bringing down the outrageously high real interest rates to reasonable levels.

H.4. SWOT Analysis

Strengths	**Weaknesses**
• Growing population and purchasing power, and hence, demand • Young, relatively well-educated population • Growing labour force	• Bottlenecks in meeting the demand for university education and new jobs • Low labour force participation rates • Large student body requiring substantial financial resources to educate • High rates of internal migration and problems of rapid urbanization
Opportunities	**Threats**
• Declining population growth • Demographic window of opportunity yet to arrive	• Social unrest due to high unemployment, lack of opportunities for university education etc.

I. CULTURAL AND SOCIETAL ASPECTS

I.1. Changes in employment structure

Over the past 80 years of Republican Era since 1923, the Turkish economy has followed the standard pattern of development with agriculture gradually losing its rank as the largest employer and exporter, and a major contributor to the GDP. The reductions in employment and output shares of agriculture have been speeded up through an ambitious set of structural reforms introduced at the beginning of the 1980s. The structural reforms aimed to transform the primarily agricultural, inward-looking Turkish economy heavily controlled by state enterprises and widespread government intervention into an export-oriented, market economy (Sayan and Demir, 2003).

When the reforms were started in 1980, primary agriculture in Turkey employed 60% of the civilian workforce. The reforms described in Section a facilitated a faster decline in the relative significance of agriculture in the economy, bringing down its employment share to 47% in 1990, and to 35% in 2000. During the same period, the corresponding shares of industry and services continuously increased (Table I.1.).

Table I.1. Shares of sectors in Merchandise Exports, Real GDP and employment

Year	**Share of Agriculture in** (%)			**Share of Industry in** (%)			**Share of Services in** (%)		
	Real GDP	*Employment*	*Total Exports*	*Real GDP*	*Employment*	*Total Exports*	*Real GDP*	*Employment*	*Total Exports*
1980	25.1	60.0	57.4	22.3	13.0	42.6	52.6	27.0	42.6
1990	17.0	46.9	17.4	26.7	15.6	82.6	56.3	37.5	82.6
2000	13.4	34.9	7.2	28.4	18.1	92.8	58.2	46.9	92.8

Source: State Planning Organisation (SPO)

Given that the GDP share of agriculture was less than 14% in 2000, productivity in Turkish agriculture is rather low, and agricultural sector still employs a lot more people than what is compatible with its contribution to national output. The apparently low productivity is in fact due to an over employment in Turkish agriculture, as agricultural sector's employment share is largely inflated by unpaid family workers. These are essentially family members who, on account of the lack of any productive skills, continue to live in rural areas and help out with traditional farming and household activities, instead of taking jobs outside the family farm. Their contribution would not have been essential in a capitalistic organisation of farm production, but traditional farming practices and family ties allow them to maintain a traditional life style in rural areas.

While non-agricultural sectors continuously increase their output and employment shares, jobs in these sectors require higher education and skill levels than participation in family farming. As a result, only low- paying, low-skill jobs remain open to unskilled rural workers who choose to migrate to urban areas. Yet, since urban job markets do not grow as fast to absorb all migrating rural workers, rural workers either choose to stay at rural family farms, or come to urban areas by risking extended periods of unemployment. While some of these migrant workers manage to get formal jobs, most end up getting informal jobs without any social security coverage as discussed before. Thus, even though a transition to capitalist farming practices to increase productivity in Turkish agriculture is desirable, in case such a transition occurs too fast, the other sectors will not have time to absorb the released labour. Likewise, the urban centres that already are struggling with problems of rapid rural-urban

migration that has occurred over the past decades may not have time to adjust to new flows of migrants. This issue is also taken up in Section I.3.below.

I.2. New forms of employment and their link to IST

In addition to new businesses that emerged as discussed in Section D, more flexible working arrangements and home-based consulting services etc. resulted from the increased diffusion of IST. While these are more typical to be observed in large cities, the extent to which such arrangement are common is very difficult to document. Some NGOs have also moved to mobilize certain local resources to commercialize home-based activities in smaller towns and rural areas through IST. Informatics Association of Turkey, for example, implemented a project to promote the development of eTrade at the local level in Denizli: The eCity project, initiated by the Association in 1998, aims to support the marketing of handcrafts on the internet (Tuzun and Sezer, 2002).

I.3. Migration and mobility

Table I.2. Various indicators related to labour force, urbanization and quality of life 2001

INDICATORS	**TURKEY**	**EUROPE & CENTRAL ASIA**	**LOWER MIDDLE INCOME**
Population mid year (millions)	66.2	475	2 164
GNI per capita (atlas method , US $)	2 530	1 960	1 240
AVERAGE ANNUAL GROWTH 1995-2001			
Population (%)	1.5	0.1	1.0
Labor force (%)	2.3	0.6	1.2
MOST RECENT ESTIMATE (latest year available, 1995-2001)			
Poverty (% of population below national poverty line)	…		
Urban population (% of total population)	66	63	46
Life expectancy at birth (years)	70	69	69
Infant mortality (per 1,000 live births)	34	20	33
Child malnutrition (% of children under 5)	8		11
Access to an improved water source (% of population)	83	90	80
Illiteracy (% of population age 15 +)	14	3	15
Gross primary enrolment (% of school-age population)	100	102	107
Male	104	103	107
Female	95	101	107

Source: World Bank.

As the numbers in Table I.2. would indicate, the post-1980 economic and social development experience of Turkey can be characterised by a mix of successes and failures. In fact, even some of the indicators that seem to point to achievements would require caution to be optimistic about. The relatively rapid urbanisation of Turkish population, for example, is a mixed blessing, since it does not necessarily imply as fast an improvement in the urban standards of living: The migration from rural to urban areas has occurred at too rapid a pace for the required expansion in infrastructure to catch up or for the urban unemployment issue to be effectively addressed (Table I.3.).

While essentially a broader picture of the same phenomenon, interregional migration patterns also reflect regional development differences (Table I.4.).

Table I.3. Selected demographic indicators: 1950-1997

Year	**Total Population** (Thousands)	**Urban Population** [a] (Thousands) **[% Share]**	**Population Growth Rate** [b] (Annual, %)	**Urban Population Growth Rate** (Annual, %)
1950	20 947	3 036 **[14.5]**	2.20	
1955	24 065		2.81	
1960	27 755	6 215 **[22.4]**	2.89	1950-1960: 7.43
1965	31 391		2.49	1960-1970: 6.39
1970	35 605	11 551 **[32.4]**	2.55	
1975	40 348		2.53	1970-1975: 5.62
1980	44 737	18 825 **[42.1]**	2.09	1975-1980: 4.40
1985	50 664	23 926 **[47.2]**	2.52	1980-1985: 4.91
1990	56 473	30 516 **[54.0]**	2.19	1985-1990: 4.99
1997	62 866	40 881 **[65.0]**	1.54	1990-1995: 4.40 1995-2000: 4.67

Source: Compiled from SPO and SIS data by Sayan (2001).

[a] Number of people living in towns with a population of 20,000 or more (for 1997, provincial and county centres).

[b] As compared to the previous period.

Table I.4. Regional migration patterns between 1985 and 1990

Region	**Number of Immigrants Coming in (1)**	**Number of Emigrants Going out (2)**	**Net Immigration (+)/Emigration (-) Ratio* (‰)**
Aegean	564 679	-381 698	25.52
Black Sea	365 896	-793 984	-53.28
Central Anatolia	671 609	-821 715	-15.67
Eastern Anatolia	238 865	-671 255	-82.22
Marmara	1 525 195	-684 543	68.93
Mediterranean	487 276	-356 159	19.94
Southeastern Anatolia	211 653	-355 819	-30.33

Source: State Planning Organization, 1983-1997 Döneminde Bölgesel Gelişmeler [Regional Developments during the 1983-1997 Period] (http://www.dpt.gov.tr/bgyu/bg83-97.html - 1)

I.4. Changes in consumption patterns

The consumption patterns all over Turkey have been changing at an amazing pace since the 1980s when the country began to open up. Supported with a continuous bombardment of commercials on TV channels and radio stations, and the media's portrayal of "good life," along with the substantial increase in the availability of affordable transportation, consumption- and shopping-oriented "American lifestyle" is getting increasingly adopted by practically all sections of the society, though the extent of this adoption varies depending on income levels, age and in part, on cultural backgrounds. Deep freezes, for example, are

getting increasingly popular appliances as more and more families begin to do their grocery shopping in bulk amounts in longer time intervals.

Coupled with the increases in household incomes, the increased popularity of credit cards and store cards and the conveniences of e-shopping and particularly eBanking have also contributed substantially to the increasing orientation of people (especially people who are younger than about 50) towards consumption and shopping.

As a result, small neighbourhood stores offering limited variety are getting replaced by nationwide chains of giant supermarkets, department stores and shopping malls mushroomed across the country to serve to people from all walks of life, pretty much everywhere except for very small rural areas. Even in small rural areas, once popular county fairs are fast disappearing due to the frequent visits that small towners could now pay to bigger towns and cities. Held for a few days every year in small towns, these county fairs ("panayir" in Turkish) were events that people from neighbouring towns and rural villages looked forward to have their major shopping and entertainment needs be satisfied. The widespread availability of a mind boggling variety of domestically produced and imported consumer goods, coupled with the availability of close substitutes within lower price ranges of many goods, have even brought the smuggling of consumer goods (from different varieties of tea, coffee and tobacco to electronics products) across borders in the Eastern and South Eastern Anatolia regions to an end without requiring enforcement of customs laws by border police and gendarmerie. Such smuggling activity has been a serious business out of which many families have made their living until the late 1970s. Likewise, popular shopping need-motivated tourist trips abroad of the previous decades have practically come to an end.

Due to the typical admiration and fast adoption rates of convenience items by Turkish people, the products such as radios in the 1950s, record players and tape recorders in the 1960s, TVs and cassette-players in the 1970s, video recorders and dishwashers in the 1980s, and cell phones in the 1990s have been quickly democratized as soon as

technology-induced reductions in their prices have made them affordable for large ranges of income groups. Like in the case of TVs once, cell phones whose ownership was an income and status symbol for a short while are owned and used by people from practically all income groups. Today, what gives an idea about people's income level is not the cell phone ownership itself but the type of cell phone owned.

In summary, practically all sections of the society in Turkey are following the general trend towards increased consumption spending like in the rest of the world, with the variations observed due to such limiting factors as income level, and age/education level and to a lesser extent, cultural and regional differences. Naturally, the consumption patterns emerging with the increased overall consumption spending in Turkey obey the well-known Engel’s Law of economics, with the share of basic necessities such as food declining in consumer expenditures as incomes increase.

I.5 Cultural patterns (cultural habits, use of time and knowledge)

For historical reasons, Turkey has a rather large and diversified population culturally and ethnically, and with respect to income and education levels, and even with respect to the degree of religious orientation. Yet, the attitudes towards the adoption of IST do not seem to be affected in a major way by the cultural and ethnic backgrounds or the degree of religious orientation in any significant way in the statistical sense. In the absence of any studies or large scale surveys conducted, it is difficult to present documentation or evidence for this view. Yet, one can, for example, use the amount of broadcasting time devoted to internet shows and the like on different TV channels, and their contents as a rule of thumb. Neither the contents of such shows, nor the time allocated to them display any noticeable differences even though some of the channels clearly broadcast for more conservative/religious audiences, with the degree and type of religious orientation changing within a wide range across the target audiences.[38]

As for the attitudes towards the use of time and knowledge, Turkey has clearly had a major transformation over the past two decades, particularly after the establishment of Istanbul Stock Exchange and the termination of fixed exchange rate regime in the 1980s clearly giving everybody the signal that when prices of assets keep changing round the clock, completion of a transaction one minute before or two minutes later would matter. High rates of inflation also played an important role in the development of an appreciation and understanding of the value of information, as well as better time management practices, as everybody from housewives to small farmers in the remotest villages were forced to do comparison shopping before their purchases and to convert their domestic currency cash receipts into assets like foreign exchange, gold, mutual funds, stocks or bonds –even when they knew that they would have to use these receipts to settle certain payments in two or three days. As soon as repurchasing agreements (repos) were introduced by the banking system enabling people to place their overnight savings on return assets, they have become and remained widely popular. Likewise, the introduction of significant late payment penalties on monthly credit card dues, has long taught Turkish people the significance of time and helped develop a strong sense of responsibility with respect to deadlines. Today, all sorts of regular payments (utility or phone charges etc.) are billed with information on late payment fees.

The increasing complexity of daily life for everyone has resulted in a boom in the demand for time-saving services like home banking through the phone or internet, ability to place standing orders for automatic payments on stock or mutual funds purchases through non-bank financial intermediaries or automatic payments of bills, and thanks to its competitive structure, Turkish financial system has generously provided these services by making the necessary spending on infrastructure investment (see also Section E).

I.6. Role of NGO's

Turkey has had a long-history of NGOs but they had been concentrated in certain areas. Trade Unions, for example, have been around for a long time and they have always been influential politically. The number of NGOs and their areas of activity have significantly increased after

[38]These TV channels are TGRT, the mainstream conservative, somewhat religious national network; STV or Samanyolu TV, the national network supported by one of the most intellectual religious groups; Kanal 7, the national network targeting conservative/religious audiences that back the currently ruling Ak Parti, the party that aspires to become Muslim Democratic equivalent of Christian Democrats in Europe, and Mesaj TV, the cable channel with the smallest but the most religiously-oriented viewership.

the 1980s, and they have gained increased recognition, beginning to exert political power in decision-making processes in different areas. As partly discussed in Section B, NGOs in Turkey fully support further development of IST.

I.7. SWOT Analysis

Strengths	**Weaknesses**
• Growing population and fast rising upward trend of purchasing power, combined with a strong tendency towards consumption society • Young, relatively well-educated population • Rich cultural diversity of people with different ethnic backgrounds • Strong family ties and social networks that facilitate coping with the effects of economic crises • No serious poverty problem • Urbanized population • High rates of technology adoption • Rapidly developing time management culture and appreciation of the value of information • High rates of primary school enrolment	• High unemployment • Unequal distribution of income • High rates of internal migration and problems of rapid urbanization lowering the quality of urban living • Regional development differences
Opportunities	**Threats**
• Decline in the rate of population growth • Growing harmony and decreasing social tensions; domestic terrorism on the decline • Demographic window of opportunity yet to arrive	• Politically unstable region (bordering Iraq, Iran, Syria) • Prolonged recovery from economic crisis • Political instability • Social unrest

DIAGNOSIS OF FACTORS AND IMPACTS IN THE INFORMATION SOCIETY IN TURKEY

Several factors have played an important role the evolution of the ICT sector and the demand for Information Society technologies. The following have been identified in this study as the most important:

- the macroeconomic instability of the country and its effect on growth,
- the presence of a relatively strong industrial background for ICT production,
- commitment to IS development is shown at the policy formulation level, - however, implementation thereafter tends to be generally inefficient, slow and too bureaucratic,
- the significant gaps between different strata of the society lead to different levels of access to IST services and goods,
- the polarized nature of the education system (related to the point above)
- the political regime has, for long periods, been characterized by high degrees of power polarization, corruption, and slow progress with reforms

I. Macroeconomic instability weakening the long-term growth performance of the country

The most important weakness that prevents faster IS development in Turkey is the macroeconomic instability that prevents the country from achieving its potential. However, given that the economic stabilisation programme of 2001 has begun to produce positive results towards increased macroeconomic stability and better growth performance, Turkey can once again be expected to take giant steps towards further economic and social development in the next decade or so. This coming transformation is likely to be as large as the transformation Turkey experienced in the 1980s, and may more than compensate for the lost decade of the 1990s. One major weakness - the significant share of employment in agriculture - may take longer than a decade to fix. Though this share will decrease continuously, it is unlikely to go lower than 15-20% in the next decade. Thus, it will remain higher than that of most other countries that are as developed as Turkey.

The result of political polarization has been the rapid growth in budget deficits, which in turn has led to a significant increase in the public borrowing requirements and the public debt stock and hence, the interest rates. Coupled with the increased country risk, the real (i.e., inflation adjusted) interest rates in Turkey began to fluctuate between 20-30%. This, combined with the level of Turkish financial openness to short-term capital flows, led to an unavoidable currency crisis. The country experienced two severe economic and financial crises in the 1990s (1994 and 1999) and one in the early 2000s. It suffered major set-backs in growth performance, as excessive public borrowing to close budget deficits and the borrowing-induced high interest rates discouraged private domestic investment. High inflation and interest rates combined with the uncertainty created by political instability have made Turkey not only a very risky destination for FDI (which has lowered FDI inflows), but also caused Turkish investors to heavily invest abroad, rather than in Turkey.

As a result, the economy's capacity to absorb the growing supply of labour has been markedly reduced, leading to high rates of unemployment not only among low- or unskilled workers, but also among the educated youth in urban areas. This, in turn, contributes to the brain drain. Also, growing unemployment has further reduced the chances of unskilled workers who migrated from rural to urban areas, forcing them to turn to marginal jobs, or to work illegally.

The economic contraction in 1999 was deepened by the terrible earthquake that hit the areas with the highest concentration of manufacturing industries. Two major economic/financial crises in November 2000 and February 2001 put an abrupt stop to the economic recovery and caused the loss of about two million jobs.

In short, budget deficits and high rates of inflation and real interest rates heavily contributed to the severe economic crises, slowing down the transition to an Information Society. Firstly, high real interest rates increased the cost of borrowing for the private sector and discouraged private investment spending by domestic investors to a significant extent, lowering the economy's capacity to absorb the growing labour force and causing hikes in the unemployment rates.

Secondly, high inflation, lack of political stability and the associated increase in the volatility of returns, increased investment risk in Turkey, often causing foreign investors to avoid Turkey as an FDI destination. Furthermore, many domestic investors preferred to invest their funds in other countries which offered more stable macroeconomic environments for FDI. Consequently, Turkey has become a country with a negative FDI balance, ranking 33rd in the META rankings of countries by net FDI abroad. This has further restricted domestic job creation.

Finally, the burden of servicing increasing debts has left the government with very little to spend on public investment in areas like education, health or the development of the Information Society.

The recent economic crises have not only reduced the prospects for growth in IST use in Turkey, through the reductions in domestic and foreign private investment or required cuts in public spending, but have also affected its current level of development. During the latest crisis, for example, 1.5 million people were forced to cancel their GSM subscriptions and ceased to use their mobile phones (see the box at the end of this section). On another front, the volume of trade in ICT equipment continuously increased until 2001, when the economic crisis again caused sharp reductions in imports.

The single biggest obstacle to the development of the IS in Turkey is the macroeconomic instability it has suffered sing the 1990s. Successive elections have been held early and governments have been frequently replaced. Turkey has lost the momentum of continuous reforms in the right direction and rapid growth that it experienced in the 1980s. Many years have been wasted with political in-fighting, and the attempts by incumbent governments to retain power with populist measures. Time wasted in dealing with the recent economic crises has been particularly costly as regards Turkey’s Information Society development, especially as compared with the amazing pace of IST/ICT developments worldwide.

II. Industry: strong information technology sector, increasing though very volatile FDI in ICT sector

Among the positive aspects affecting Turkey’s ICT development, the presence of a solid and expanding industrial base has been important. Turkey has always been a significant producer of manufactured products and recently this organic growth resulted in the rapid emergence of an ICT-producing segment of the manufacturing industry. The growing technological intensity of manufacturing production has also been a strong stimulus for the ICT sector.

The most important strength for further ICT development is the growing production and export of technology-intensive products, particularly consumer electronics. The generally high degree of competition within the Turkish electronics industry will help the international competitiveness of these products to increase continuously. Despite the rather low level of overall FDI inflow into the country, the concentration of FDI in ICT firms is helpful.

Two factors have harmed the evolution of the ICT sector. One is the already mentioned political and economic instability, which has lowered both domestic and foreign investment in every sector, including ICT industries, to below what would have otherwise been expected. The repeated crises have reduced the output demand of these sectors and have led to significant downturns in production and investment. Another factor that has had negative spillover effects on the evolution of the ICT industry has been increasing social and regional disparities. These have led to a slowdown of consumption and retarded the growth of ICT producing sectors.

III. Institutional set up and economic and policy environment

Due to its long history and tradition of institution building, Turkey has a very well-developed institutional structure and a well-educated bureaucracy. As stated in a recent report by the European Commission (Enterprise DG, 2002), among the CCs "only Turkey has an institutional structure with a long tradition of policy development in the field of innovation. In addition, there are no government agencies with a direct remit for innovation policy in any of the seven countries except Turkey."

It is difficult, however, to argue that this well-developed structure always functions efficiently. In fact, as a result of the political instability, the processes of policy-making and policy implementation in Turkey show a lack of punctuality and continuity in both IS policies and other areas.

In many instances, this unstable environment has contributed to failures in the making, -coordination, and implementation of policy in many areas, including IS policies for at least three reasons. Firstly, policies that are not likely to have immediately favourable effects for sizable sections of the electorate have lost their priority on the policy agenda, sometimes causing significant delays in the legislation or introduction of such policies. Secondly, uncertainties about the continuity of political support to certain policies in the aftermath of every election have caused delays in implementation, even when legislation for these policies already exists. Thirdly, individuals or teams in the bureaucracy, who played key roles in the policy-making and implementation processes, have often been replaced before significant progress has been achieved. There are then long delays while the new individuals or teams get up to speed with the issues.

Perhaps the best example that illustrates these points is the delay experienced in the privatisation of Turkish Telecom, shown in the box on the next page.

Box. The privatization delays with Turkish Telecom

Turkish Telecom was separated from the PTT and turned into an independent company in the 1980s, as part of a restructuring effort directed toward its privatisation. This was one of the earliest attempts in the world to privatise an incumbent operator, and, due to Turkish Telecom's success in the expansion of the basic telephone service, it seemed that it would be easy to privatise for large sums. However, an alliance of leftists and nationalists in opposition to the privatisation of Turkish Telecom, for reasons of national interest, was formed. Several drafts prepared by Parliament for privatisation were turned down by the Constitutional Court on legal technicalities presented by this alliance. For every draft turned down, revisions were made to address the Constitutional Court's concerns. Meanwhile, successive governments lost Parliamentary support for the enactment of the new drafts, due to a political crisis or an early election before they had the chance to go ahead with the privatisation.

After more than a decade of muddling through, Turkish Telecom is still a publicly owned company, despite the eventual resolution of legal problems. Even if the next attempt to privatise it is successful, it is currently worth a fraction of what it was worth initially, because of the saturation of the demand for telecom privatisation in the world. As will be shown in the following sections, failures to privatise Turkish Telecom not only cost Turkey the benefits from its sale, but also hindered the development of the IS in Turkey.

Another example of the slow-working legislation process in Turkey is the delay in frequency allocation to private broadcasters by the Supreme Council of Radio and Television Broadcasting (SCRTB). The main reason behind the establishment of the Council was to put an end to the frequency chaos experienced at the beginning of the 1990s when hundreds of unlicensed private radio and TV stations suddenly invaded the airwaves by renting broadcasting time from various satellite operators abroad. Even though it has been nine years since the SCRTB became operational, the frequency allocation process has yet to be completed due to various legal problems (see also Section F).

IV. IST policies

IS policy development started at the beginning of 1990s with the participation, cooperation and interaction of all stakeholders and resulted in an important learning process. While governments have been able to develop their policies in this area, implementation has been weak for various reasons, including political fragmentation, lack of coordination and repeated financial and economic crises and their consequences. IS policies have been integrated within policies for national innovation, human capital development, science and technology, and investment, which has allowed coordinated development at least at the policy making level, but, again, less at the implementation level.

Besides the lack of political strength and scarce financial resources, there has been no development in the area of regional IS planning and policies, despite the size and diversity of the country. The regional differences are huge, and the dividing lines between the various strata of the society are significant. It is therefore a significant policy weakness that insufficient attention has been devoted to these issues.

However, the recent efforts by the Government under the eTransformation Turkey Project seem promising, as this project's structure takes into account lessons from previous problems

in policy implementation. This could be due to the presence of a more determined leadership, and also to the slightly better macroeconomic situation, which allows more spending on IS developments. The improved political and economic stability may contribute to higher priority being given to IS policy issues, while other economic and social problems may decline in their relative importance and receive less attention.

Besides general IS policies, it is worth mentioning several areas where policies have not been able to proceed fast enough. These represent a significant obstacle for IS development. Firstly, past governments have not devoted sufficient attention to ensuring access and to removing those major barriers that prevent the increase of IST use in Turkey. This is true of both nationwide programmes that could stimulate the use of IST and region-specific policies that could reduce the existing regional differences.

Secondly, content development policies at the public sector level are even weaker: progress with eHealth, eGovernment has been very modest, both in terms of technological and financial development. This is also hampers the development of IST use in Turkey.

V. Education sector

Inequalities in income and education levels are the most important obstacles to IS development in Turkey. Inequalities in educational background clearly contribute to a digital divide at national level, since the less educated tend to have difficulty in fully integrating themselves into the Information Society. While the enrolment rates for primary education are close to 100%, enrolment rates for secondary and tertiary education are low. In the case of secondary education, this is because demand is low, and in the case of tertiary education, universities do not have the capacity to admit all applicants. Educational reform, successfully implemented in 1997, increased compulsory primary education from 5 to 8 years. This was a major achievement, but by no means has it been a solution to the low enrolment rates to secondary education.

Low enrolment rates to universities result from the accumulation of high school graduates unable to gain admission by scoring high enough in the extremely competitive placement exams repeated every year nationwide, rather than the lack of demand for university education. Given the youth and the size of the population in Turkey, and population growth rates that are still high despite continuous reductions, excess demand for university education is difficult to clear in the short- to medium-term.

The low level of secondary and tertiary education results in ongoing gaps between labour supply and demand, and has been one of the key factors behind low enrolment and employment rates. Turkey has one of the lowest employment rates in the ACC countries, which themselves lag some distance behind the EU-15 levels.

In spite of the low enrolment rates, the developments in eBusiness and phone banking/eBanking services, coupled with the high inflation/high currency substitution environment in Turkey, created strong incentives even for less educated people to become users of these services. Likewise, the intensity of commercials and ads in the media, as well as the promotion and information campaigns, such as the ones organised as part of the yearly Internet week, help raise the interest of the young people, including the less educated. However, the fact remains: the low educational level of sizable numbers of people keeps them from becoming a part of Information Society.

Besides low enrolment rates, huge financial resources are required to give more than 12 million students at primary and secondary schools computerized education. Budget constraints, that became tighter after the recent economic crises, have made it very difficult for governments to achieve marked reductions in the domestic digital divide between the well-educated and the poorly-educated/not-educated through school education over a reasonable period of time, despite a number of initiatives undertaken by the Ministry of Education.

Income inequality between regions, between rural and urban areas, and even between different neighbourhoods within cities, is perhaps a more important factor, which adds to the digital divide at the national level. Low income groups cannot afford to purchase PCs and/or pay for Internet subscriptions. In fact, TUBITAK-Bilten's survey (2001) indicated that affordability was by far the biggest factor preventing home computer ownership. After the recent economic crises, the importance of affordability as a hindrance to PC ownership has continuously increased from its 2001 level (when its share was 58.3%). PC purchases are still subject to 18% VAT, and despite lobbying efforts by various groups a reduction is not likely to come soon, due to the austerity measures introduced to control budget deficits in the fight against economic crises.

Altogether, the dual nature of the education system, especially the lack of appropriate secondary and tertiary education, is a significant bottleneck for IS developments in Turkey. It retards the ICT sector as it does not produce the required human capital and has negative implications for the development of the Information Society as well.

VI. Demographic factors

Turkey also has a large population – currently approaching 70 million - which is very diversified with respect to income and education levels, cultural backgrounds and lifestyles, and ethnic origins. Even in areas where the population appears to be very homogenous, there is significant diversity: while the overwhelming majority (about 98%) of the population is Moslem (mostly Sunni), the degree of religious commitment and the types of religious practice show a great variety.

Cultural diversity has contributed to the emergence of an extremely rich and diversified media and broadcasting industry. Currently, 261 TV and 1,200 radio stations are on the air, broadcasting to national, regional or local audiences. With as many as eight multipurpose private networks, two private news/documentary-only networks, a number of music-video networks, five channels operated by TRT, the state radio and television organization, broadcasting nationwide, as well more than 200 local channels scattered across the country, Turkish public has free access to an enviable variety of TV broadcasting which could be matched by only a few countries. Additionally, the high number of private and university-operated radio stations makes frequency-allocations very difficult in some towns.

This variety implies, firstly, that there is a solid potential demand in the population for media related technologies, and hence, the use of ICTs. Secondly, the programming on these channels tries to satisfy a large spectrum of tastes under an intense competition for ratings. The commercials for ICT products and services (including those for Internet service providers and services offered through the Internet) also appeal to these diverse tastes and therefore create spillover effects to groups that are not among the immediate targets. Thanks to these

spillover effects, there are now Internet cafes in even the lowest income neighbourhoods in large cities, and the poorest small towns in the least developed Eastern and South Eastern Anatolian regions. These Internet cafes offer Internet connections at very affordable rates to people, particularly the young, who could not possibly afford to buy a PC or have it connected to Internet.

The demographic profile of the country is supportive of IS developments. Both the population growth and the composition of the population stimulates this development. Though it creates problems in terms of the economy's ability to absorb these incoming generations, the age profile is very favourable and much better than in most Candidate Countries and New Member States. Second, the age profile of the population also supports the increased application and access to Information Society technologies, as the younger generation adapt more easily to new technological developments.

VII. Political regime

The uncertainty resulting from political instability also incurred tremendous economic costs, as political and economic spheres have been in constant interaction. Politically strong single-party governments have managed to take bold steps towards reform and to introduce economic measures needed for long-term growth. The actions of politically weak minority or coalition governments, on the other hand, have been driven by a constant fear of early elections, forcing them to use the budgetary resources at their disposal too generously, continuously increasing public spending to satisfy different pressure groups.

It is not pure coincidence that the Turkish economy performed especially poorly in the 1970s and 1990s, the decades that witnessed no single-party government. During these two decades, early elections were repeatedly called for to replace weak coalition governments, but they consistently failed to break the deadlock, producing a new coalition government each time. The 1980s, on the other hand, turned out to be the decade of major reforms and strong performance in many of the economic indicators, thanks to the political stability Turkey enjoyed under politically strong, single-party governments led by the late Prime Minister Turgut Ozal.

Among other events, the 80s witnessed a communications revolution with significant achievements with regard to the physical infrastructure and supply of services. Just prior to 1980, telephone line density had reached only about 2.5 lines per 100 inhabitants, and more than 72% of Turkey's 40,000 villages and rural settlements had no telephone service at all. Thanks to the steps taken by Ozal governments, Turkey became one of the few countries in the world which had access to all state-of-the art telecom services, including direct dialling for long-distance and international calls. Turkish Telecom became one of the most successful operators in the world in terms of raising teledensity across the country during the 1980s.

Political instability and frequent elections have inflicted serious damage on the Turkish economy. They have made the introduction of bold structural reforms difficult, since short-sighted politicians typically avoid taking politically risky steps, such as the privatisation of state enterprises, prior to any upcoming elections, no matter how much they are needed for sustainable growth in the long-run. They have also disturbed macroeconomic balances by creating additional incentives for overspending of public funds prior to elections. As a result, consequences of serious macroeconomic imbalances such as high rates of inflation and interest rates have filled the policy agenda in Turkey, lowering the priorities of other policies

such as the IS policies. Turkey has, in fact, been a living example of the interaction between political and economic instability, particularly during the 1970s and the 1990s.

To sum up, the political system, its polarization and the strong influence of political business cycles, have been paralyzing factors for both economic development and IS progress. In that respect, the current political situation is much more conducive to real change, both in economic policies and also in the political, geopolitical standing of the country. The presence of a democratically elected but strong and committed government may be an important factor that could help to modernize the Turkish economy and its ICT sector.

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A. NATIONAL AND REGIONAL ECONOMY

Table A.1.1. Income indicators

Year	Nominal GDP (bn. ECU/EUR)*	PPP GDP/ Capita (ECU/EUR)*	Growth of Real GDP --at 1987 prices-- (%)
1990	117.9	3 683	9.3
1991	122.1	3 866	0.9
1992	122.6	3 966	6.0
1993	154.0	4 810	8.0
1994	108.7	4 518	-5.5
1995	131.2	4 442	7.2
1996	144.9	4 887	7.0
1997	169.0	5 716	7.5
1998	178.4	5 569	3.1
1999	173.7	5 575	-4.7
2000	217.1	6 885	7.4
2001	165.9	6 796	-7.4

Source: State Planning Organisation (SPO), OECD.
* Conversions into ECU/EUR are based on yearly averages of exchange rates reported by the Turkish Central Bank (TCMB)

Table A.1.2. GDP per capita at PPP (ECU/EUR)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
BG	4727	4719	4000	4486	4611	4527	4321	4568	4726	5189	6681
CZ	..	..	7830	8901	9131	9142	10095	11205	11138	12131	15022
EE	6451	6286	5056	5342	5382	5292	5811	7466	7757	8398	11030
HU	7292	6758	6454	7234	7512	7227	7587	8912	9461	10597	13245
LV	6866	6499	4234	4128	4230	3984	4309	5311	5658	6426	8172
LT	7175	7118	5555	5257	4791	4831	5355	6525	7067	7527	9357
MT	6912	7769	8082	9521	10178	10119	10985	12784	13472	14537	19319
PL	4778	4571	4546	5284	5594	5583	6102	7297	7636	8554	10663
RO	4251	3919	3617	4150	4324	4372	4757	5018	4792	5114	6132
SK	7179	6486	5963	6453	6808	6735	7416	8795	9137	10038	12289

Source: The World Bank (http://devdata.worldbank.org/hnpstats/), own calculations

Table A.2. Composition of GDP growth

Year	Growth Rate of Output* by Sector (%)			Demand Components of Growth in Real GDP* (%)				
	Agr.	Ind.	Ser.	C	I	G	X	M
1990	6.8	8.6	10.3	13.1	15.9	8.0	2.6	33.0
1991	-0.9	2.7	0.6	2.7	0.4	3.7	3.7	-5.2
1992	4.3	5.9	6.5	3.2	6.4	3.6	11.0	10.9
1993	-1.3	8.2	10.7	8.6	26.4	8.6	7.7	35.8
1994	-0.7	-5.7	-6.6	-5.4	-16.0	-5.5	15.2	-21.9
1995	2.0	12.1	6.3	4.8	9.1	6.8	8.0	29.6
1996	4.4	7.1	7.6	8.5	14.1	8.6	22.0	20.5
1997	-2.3	10.4	8.6	8.4	14.8	4.1	19.1	22.4
1998	8.4	2.0	2.4	0.6	-3.9	7.8	12.0	2.3
1999	-5.0	-5.0	-4.5	-2.6	-15.7	6.5	-7.0	-3.7
2000	3.9	6.0	8.9	6.2	16.9	7.1	19.2	25.4
2001	-6.1	-7.5	-7.6	-9.0	-31.7	-8.6	7.4	-24.8

Source: SPO
* At 1987 prices.

Table A.3. Developments in labour markets as indicated by labour market surveys

Year	Labour Force (thousands)	Participation Rates (%)	Unemployment Rates (%)		
			Overall	Males	Females
1990	20 847.3	56.6	8.0	7.8	8.5
1991	21 438.0	57.1	8.1	8.5	7.0
1992	21 503.0	56.1	8.3	8.6	7.6
1993	21 469.0	52.2	8.8	8.6	9.1
1994	22 158.0	54.6	8.4	8.6	8.0
1995	22 673.0	54.1	7.5	7.6	7.3
1996	22 919.0	53.5	6.5	6.8	5.9
1997	21 824.5	52.2	6.7	6.3	7.8
1998	22 399.0	52.3	6.8	6.8	6.9
1999	23 187.0	53.0	7.7	7.7	7.5
2000	22 031.0	49.2	6.6	6.6	6.5
2001	22 269.0	48.7	8.5	8.8	7.9
2002	n/a	n/a	10.6	n/a	n/a

Source: State Institute of Statistics (SIS)

Table A.4. Regional rates of unemployment by labour market surveys, 2000

Region	Unemployment Rate (%)
Aegean	8.0
Black Sea	3.9
Central Anatolia	4.2
Eastern Anatolia	3.0
Marmara	8.0
Mediterranean	8.9
South-eastern Anatolia	7.0

Source: SIS.

Table A.5. Changes in labour productivity in Turkey

Year	Nominal GDP/ Labour Force (in ECU/EUR)	Real GDP/Labour Force (in millions of TL at 1987 prices)	Growth Rate with respect to Previous Year (%)
1990	5 654	10 447	
1991	5 696	10 414	-0.32
1992	5 701	10 771	3.43
1993	7 175	10 976	1.90
1994	4 904	10 872	-0.95
1995	5 786	13 052	20.05
1996	6 320	16 115	23.47
1997	7 744	16 811	4.32
1998	7 963	17 076	1.58
1999	7 491	14 370	-15.85
2000	9 853	17 998	25.25
2001	7 448	12 943	-28.09

Source: Calculated from GDP and labour force data reported elsewhere.

Table A.6. Indicators of openness for Turkish economy

Year	Value of Exports (Million ECU/EUR)	Index of Value of Exports	Exports/ GNP (%)	Per Capita Exports (ECU/EUR)	Value of Imports (Million ECU/EUR)	Index of Value of Imports	Imports/ GNP (%)	Per Capita Imports (ECU/EUR)
1980	2090	100	4.2	47	5681	100	11.3	128
1985	10429	499	11.7	207	14865	262	16.6	295
1990	10178	487	8.5	181	17516	308	14.6	312
1991	10970	525	8.9	191	16984	299	13.8	297
1992	11336	542	9.2	194	17619	310	14.2	302
1993	13104	627	8.4	220	25131	442	16.2	424
1994	15224	728	13.8	252	19563	344	17.7	324
1995	16541	791	12.6	268	27300	481	20.8	443
1996	18291	875	12.6	292	34359	605	23.6	548
1997	23240	1112	13.5	265	42973	756	25.0	673
1998	24031	1150	13.1	370	40913	720	22.3	630
1999	24958	1194	14.2	377	38178	672	21.7	577
2000	30086	1440	13.8	446	59037	1039	27.1	875
2001	35009	1675	21.3	511	45141	795	27.5	658

Source: State Planning Organization (SPO) and State Institute of Statistics (SIS)

Table A.7. Macroeconomic balances and indicators

	1981	1991	2000	2001
DOMESTIC PRICES (% change)				
Consumer prices		65.9	54.2	60.7
Implicit GDP deflator	44.1	58.9	49.9	57.2
GOVERNMENT FINANCE (% GDP includes current grants)				
Current revenue		21.0	29.0	31.5
Current budget balance		1.7	-11.0	-14.1
Overall surplus/deficit		-10.2	-18.9	-20.9
TRADE (ECU/EUR million)				
Total exports (fob)	4212	11029	34301	39386
Textiles	798	3808	10885	11555
Processed agricultural products	1452	2077	1827	2096
Manufactured products	3181	9814	27448	32054
Total imports (cif)	8001	16984	58988	47240
Fuel and energy	3680	3187	10322	9315
Capital goods	1722	5780	12486	8474
Export price index (1995=100)		94	78	78
Import price index (1995=100)		92	81	77
Terms of trade (1995 = 100)		101	96	101
BALANCE AND PAYMENTS (ECU/EUR millions)				
Exports of goods and services	5 391	17209	54288	55580
Imports of goods and services	8 124	19549	67367	51215
Resource balance	-2 733	-2339	-13078	4364
Net income	-1 292	-1574	-3217	-4819
Net current transfers	2 291	4115	5660	4248
Current account balance	-1 733	202	-10636	3794
Financing items (net)	1 729	-1032	7390	-18231
Changes in net reserves	4	830	3246	14437
Memo:				
Reserves including gold (ECU/EUR mill.)	1 546	9888	37680	35173
EXTERNAL DEBT AND RESOURCE FLOWS (US$ million)				
Total debt outstanding and disbursed	17230	41053	128125	128778
Total debt service	2149	6688	22461	26027
Composition of net resource flows				
Official grants	93	1520	32	0
Official creditors	1023	-595	1055	1448
Private creditors	-9	4926	10094	-2548
Foreign direct investment	85	632	121	3093
Portfolio equity	0	-2406	-5424	-4631
World Bank Program				
Commitments	502	726	1936	2458
Disbursements	407	366	1398	1717
Principal repayments	57	543	533	489
Net flows	349	-177	867	1229
Interest payments	91	409	258	326
Net transfers	258	-587	609	903

Source: World Bank (2002).

B. NATIONAL AND REGIONAL INFORMATION SOCIETY POLICIES

B1-History of ICT Infrastructure in Turkey

Turkey was introduced to Distant Area Networks in 1986 through the Earn/Bitnet connection from Ege University to Italy. With the creation of Turkish Network of Universities and Research Institutions (TUVEKA), the member institutions were enabled to get connected to the Earn (European Area Research Network) and to use e-mails starting from 1987. Due to its technical inadequacy and capacity limitations, however, the Earn began to experience problems and to face bottlenecks after 1989. This was when the internet debate intensified in Turkey and in 1991, the Scientific and Technological Research Council of Turkey (TUBITAK) began to look for alternatives to TUVEKA:[1]

- TUBITAK's application to National Science Foundation (NSF) and CERN for a connection (December 1991)
- Application accepted by NSFNET and CERN (March 1992)
- Request filed with Turkish Telecom for a 64 Kbit/second line (July 1992)
- The first router was set up (September 1992)
- The first experimental internet connection established between NIKHEF Research Centre in Holland and Middle East Technical University (October 23, 1992)

The public at large in Turkey was then introduced to internet for the first time through a connection established with the USA on April 12, 1993 at a speed of 64Kbit/second. The initial work toward the strengthening of internet infrastructure was carried out by the Scientific and Technological Research Council of Turkey (TUBITAK) and the Middle East Technical University (METU), a public university.

With the support of TUVEKA, TCP/IP work was started to expand the connection between METU and TUBITAK to Bilkent, Istanbul Technical and Yildiz Universities, and these five institutions made up the core of TR-NET. The rest of 1993 was spent with the universities' learning efforts.

In 1994, traffic over TR-NET reached 20 Gb a month. Further growth of internet was prevented largely by the major economic crisis Turkey experienced in the same year. Nonetheless, the increasing demand for internet services caused private service providers to emerge, and these began to provide service to non-academic and commercial users and individuals. Then, the work to convert TR-NET into an independent service provider began.

In November 1995, a consortium formed by Sprint, Inc., Satko, Inc. and METU won the bid to create the national internet network, TURNET, on the basis of a revenue sharing agreement with Turkish Telecom. TURNET was intended to become operational as of January 1996. However, the initial agreement set the share of Turkish Telecom at 70.2%, and the consortium members later realised that it would be impossible to operate TURNET with such a high share of revenues going to Turkish Telecom. The composition of the consortium changed shortly afterwards as Satko and METU left and Sprint merged with other companies based in France and Germany. At the same time, potential users expecting high connection charges and fees began to raise their voices, and organised the first protest campaign in April 1996. Turkish Telecom responded by promising lower connection charges through devoted modem lines

[1] TUVEKA dissolved itself later in 1996 when it had 30 member institutions.

that start with 700, and later changed this to 800-lines with fixed monthly fees of USD 10. This decision proved unpopular and was taken back in 2000 because of heavy criticism it received.

With the resulting delays, TURNET could not become operational until the Fall of 1996, with many of the internet service providers beginning to get connected as late as December 1996. Due mostly to Turkish Telecom's lack of experience as an internet backbone operator, combined with its inflexibility, TURNET was born with problems and 1997 was mostly spent with the protests and heated debates about the ad-hoc proposals Turkish Telecom developed to address pricing and other issues subjected to severe criticism. At the end, TURNET was replaced by TTNET and became a subsidiary of Turkish Telecom acting as an independent service provider in 1998.

The process leading to the creation of TURNET and then TTNET showed everybody that Turkish Telecom was one of the most important players to play a role in the transition to IS. Yet, the role that Turkish Telecom assumed in the process was a dual one as an internet service provider and the (sole) provider of infrastructure, and this was causing problems.

In fact, Turkish Telecom's success in the expansion of the basic telephone service had not been matched by its performance in other areas. As the TURNET/TTNET experience showed, Turkish Telecom failed to fully satisfy user expectations, skilled manpower requirements and flexible structuring, slowing down the development of national information infrastructure, and improvements to services to be provided over the basic telecommunications network covering the ISDN, IN (intelligent network) and other services. This inadequacy reached its peak in the provision of access to internet. Even though this is an area where all network operators in the world were caught more or less off guard, the adjustment in Turkey, in general, and of Turkish Telecom, in particular, has been relatively slower (MTC, 1999).

As a result, the privatisation of incumbent operator and liberalisation of the market were reintroduced to the policy agenda in the second half of the 1990s. However, except for the issuance of two GSM 900 mobile licences in 1998 and DCS 1-800 mobile licences in 2000, not much progress has been recorded with respect to privatisation.[2]

The privatisation of Turkish Telecom was tendered twice in the course of 2000. The first tender for a 20 percent block sale of Turkish Telecom was issued on 13 June 2000. As this tender could not be finalised, a second tender under the modified terms was commenced on 14 December 2000 and involved the sale of 33.5 percent share with remarkable management rights attached. Various Turkish conglomerates have bought tender specifications, but due to the lack of interest from the international side, this tender was also cancelled.

Unlike some of the previous attempts where the privatisation of Turkish Telecom was prevented by the rulings of the Constitutional Court, this block sale tender process failed due to both terms and conditions set by the Turkish government (such as the inadequacy of shares put on sale and the problem of full management control) and the poor timing (such as PSTN's declining popularity against mobile communications, and funding problems encountered by international telecom operators). The need to improve the terms of Turkish Telecom's privatisation led to a quest for a more transparent telecommunications regime, thereby requiring further modifications to the legal framework. With the ratification on 23 May 2001

[2] The rest of the discussion about the telecommunications sector in this section relies on SPO (2001).

of Law No. 4673, certain articles negatively affecting the prospects for the privatisation of Turkish Telecom were amended in such a way to facilitate privatisation.

Currently, one of the most important challenges to increase the efficiency and effectiveness of the NII in Turkey is to complete the creation of the necessary institutional and legal structures to address various issues that arise, and strengthening the infrastructure. Yet, the failure of repeated attempts by Turkish governments to privatise Turkish Telecom creates additional uncertainties that make meeting these challenges more difficult.

Going back again to the mid-1990s when Turkish Telecom moved forward to create TURNET, other developments were occurring at the same time. TUBITAK, the agency that was instrumental in the establishment of first internet connection through TR-NET, had focused on providing service to academic and research institutions following Turkish Telecom's TURNET initiative. In 1996, TUBITAK established and became the operator of National Academic Network and Information Centre (ULAKNET and ULAKBIM) that replaced TUVEKA. With continuous investment in technical infrastructure and upgrading, ULAKNET and ULAKBIM have currently reached the capacity to serve to more than 1.5 million university students, and about 65,000 academics and researchers from more than 120 universities and research centres.

B2: Structure of the Internet Supreme Council

The ISC is a permanent consultative body made up of the following:

Chairman of the Council:

The Minister of Transportation and Communications, or a representative assigned by the Minister

Public Sector Representatives:

(1 representative) Ministry of Culture
(1 representative) Ministry of Finance
(1 representative) Ministry of Foreign Affairs
(1 representative) Ministry of Interior
(1 representative) Ministry of Justice
(1 representative) Ministry of Tourism
(1 representative) Undersecretariat of Foreign Trade
(1 representative) Undersecretariat of Treasury
(1 representative) State Planning Organisation
(1 representative) General Secretariat of National Security Council
(1 representative) Joint Chiefs of Staff
(1 representative) Competition Authority
(1 representative) Telecom Authority
(1 representative) TUBITAK (Scientific and Technical Research Council of Turkey)
(3 representatives) Universities (including non-profit, foundation universities)
(1 representative) Coordination Board for e-Commerce
(1 representative) Small and Medium Industry Development Org. (KOSGEB)
(1 representative) Directorate General for Communications, MTC

Representatives of Infrastructure and Technology Companies, Service and Contents Providers:

(2 representatives) Content Providers
(4 representatives) Internet Service Providers
(4 representative) Technology Companies (Computer Producers)
(1 representative) Technology Companies (Network Builders)
(4 representatives) GSM Operators
(1 representative) Turkish Telecom, Inc. (TTNET)
(1 representative) Turkish Bankers' Association
(1 representative) DNS Service Provider for .tr Domain

Representatives of NGOs and Individual users:

(1 representative) Press representative
(1 representative) Individual user representative
(1 representative) Internet houses and cafes
(1 representative) Internet Foundation
(1 representative) Turkish Informatics Foundation
(1 representative) Turkish Informatics Association
(1 representative) the Union of the Chambers of Commerce (TOBB)
(1 representative) the Union of Municipalities
(1 representative) the Union of the Chambers of Architects and Engineers
(1 representative) the Union of Medical Doctors
(1 representative) Turkish Bar Association
(1 representative) Platform for Internet and Law
(1 representative) Turkish Industrialists' Association (TUSIAD)
(1 representative) Turkish Industrialists' Association of Informatics Producers (TUBISAD)
(1 representative) Turkish Industrialists' Association of Electronics Producers (TESID)
(1 representative) All Telecom Businessmen's Association (TUTED)
(1 representative) Turkish Association of Librarians
(1 representative) Trade Unions
(1 representative) Consumer Rights Association

B3: information TUBITAK and its research institutes

TUBITAK's (http://www.tubitak.gov.tr/english/): responsibilities are:

- To determine Turkey's science and technology policies;
- To promote, support, and coordinate scientific research;
- Establishment of affiliated institutes and centres to conduct research and development activities in the selected areas accordingly with the targets set in the five-year economic development plans and the priorities set by the Science Board;
- Providing research grants to researchers;
- Carrying out organised search activities to discover youngsters with a potential to become scientists in the future, and helping them get the necessary education and training through scholarships and summer camps;
- Supporting R&D activities and innovations in industry, promoting university-industry collaboration and establishing techno-parks to facilitate such collaboration;

- Carrying out tasks undertaken through international scientific and technical cooperation agreements;
- Publishing scientific journals, books and popular science magazines to make science more accessible to the public at large;
- Supporting scientists and researchers through awards programs.

The institutes and research centres TUBITAK has set up for carrying out and supporting in-house research are:

- Marmara Research Center (MAM)
- Information Technologies and Electronics Research Institute (BILTEN)
- Defence Industries Research and Development Institute (SAGE)
- Basic Sciences Research Institute (TBAE)
- National Electronics and Cryptology Research Institute (UEKAE)
- The National Observatory (TUG)
- Cukurova Advanced Agro-Technologies Research and Development Institute (CITTAGE)
- DNA/Tissue Bank and Genetic Research Laboratories (DNA/DB)
- Ankara and Bursa Test and Instrumental Analysis Laboratories (ATAL and BUTAL)
- National Metrology Institute (UME)

Of these, BILTEN is the research institute that focuses on IST/ICT related research. The major achievement of BILTEN has been to design and produce a mini satellite that is about to be launched. As the first locally designed and produced satellite, BilSat-1 will mainly be used for distant monitoring and communications and will allow to observe changes in crop yields, environmental pollution levels and the extent of damage resulting from natural disasters. As stated in the web page of the institute (http://www.bilten.metu.edu.tr/) plans are under way for BılSat-1 to be followed by other BILTEN-designed and produced satellites.

BILTEN houses 12 research groups including the "Information Society Policies, E-Commerce and Information Security Group" which studies ICT policies and their impacts on the economy, society and technology through a multidisciplinary approach. Based on its studies, the group develops various policy recommendations that are in line with Turkey's national priorities in the area, and undertakes or gets involved in national and international research projects to generate short/medium/long term strategies and operational policy documents which recognise the public sector, universities, ICT manufacturers and NGOs as major stakeholders. National Information Infrastructure Project of Turkey (completed in 1999) and Information Technologies Diffusion and Usage Survey (completed in 2000) are among the best examples to such policy documents.

In addition to these activities, BILTEN's "Information Society Policies, E-Commerce and Information Security Group" is involved in the development of information security technologies needed for the growth of electronic trade and on-line communications, and has already released several versions of public key cryptography products it developed. Called ZEUGMA and LIDYA, these products are the first commercial applications being used in Turkey in these areas. Of these, ZEUGMA is a platform-independent Java-based certification service provider management software which produces and manages digital certificates as the main building block of the Public Key Infrastructure. It enables defining certification service providers hierarchically, creating digital certificates and limiting content and usage areas of the certificates. LIDYA, on the other hand, is an architecture that serves as a Secure

Electronic Documentation System enabling e-commerce. It is intended to replace costly and time consuming printed document flow with fast, secure and reliable flow of electronic documents. Digitally signed and encrypted electronic documents allow confidentiality, integrity, and authentication.

Complementary to these activities carried out at BILTEN are the activities that TUBITAK's "National Electronics and Cryptology Research Institute (UEKAE)" is involved with (http://www.uekae.tubitak.gov.tr/en/hakkimizda.php). This is the institute established to provide technical support to basic and applied research for the technologies needed in the areas of information security and micro electronics. With a history dating back to 1968, UEKAE started as the Electronics Research Unit of Marmara Research Centre which designed and developed various telecommunications systems for Turkish PTT; toll collection systems for the Turkish Highway Authority, and defence systems for the Turkish Navy. The unit which began its research and development activities in cryptology in 1975 was restructured into the Electronics and Semiconductor Technologies Department of TUBITAK, and as a result of its increased focus on cryptology activities, was transformed into the National Electronics and Cryptology Research Institute (UEKAE) in 1995. The UEKAE has since improved its capabilities in microprocessor design for telecommunications, and cryptographic algorithms that are so advanced to receive NATO approval.

The MRC (Marmara Research Centre) where UEKAE first began its activities back in 1968 has since evolved into a techno-park, becoming the first legally recognised techno-park in Turkey in 1998, and continues to promote collaboration between the academia and industry.

C. INDUSTRIAL DEVELOPMENT AND COMPETITIVENESS

Table C1. Shares of Sectors in Merchandise Exports, Real GDP and Employment

Year	**Share of Agriculture in** (%)			**Share of Industry in** (%)			**Share of Services in** (%)		
	Real GDP	*Employment*	*Total Exports*	*Real GDP*	*Employment*	*Total Exports*	*Real GDP*	*Employment*	*Total Exports*
1980	25.1	60.0	57.4	22.3	13.0	42.6	52.6	27.0	42.6
1990	17.0	46.9	17.4	26.7	15.6	82.6	56.3	37.5	82.6
2000	13.4	34.9	7.2	28.4	18.1	92.8	58.2	46.9	92.8

Source: State Planning Organisation (SPO).

Table C2. Value of Industrial Production by Sectors at Current Prices (in millions of ECUs/Euros)

	Food, beverages & tobacco industry	Textiles, wearing apparel & leather industry	Wood & wood products (incl. furniture)	Paper & paper products; printing & publishing	Chemicals & chemical, petroleum, coal, rubber & plastic products	Non-metallic mineral products (except coal & petroleum)	Basic metal industry	Metal products, machinery & equip.; transport. equip.; professional & scientific measurem. & control devices	Other manuf. activities
1993	1,511	1,572	1,184	396	485	270	164	1,994	85
1994	1,041	1,184	692	176	308	145	186	1,095	55
1995	1,257	1,418	1,081	319	401	207	288	1,647	53
1996	1,292	965	1,027	290	354	175	324	1,814	51
1997	1,764	1,141	1,024	343	531	205	248	2,204	52
1998	2,015	1,149	1,169	379	598	215	252	2,275	66
1999	2,244	1,354	1,353	397	581	226	217	2,471	57
2000	2,513	1,386	1,540	495	750	268	291	3,202	73

Source: SIS Industrial Establishments Survey converted into ECUs/Euros (http://www.die.gov.tr/IstTablolar/16im203t.xls)

Table C3. Industrial Production by Sectors (Volume Indices by Sectors, 1997=100)

	Manufacturing industry	Machinery and equipment	Office accounting and computing machinery	Electrical machinery and apparatus	Radio, TV and communications equipment
1990	69.08	60.23	47.99	52.20	44.26
1991	70.37	59.08	67.69	55.16	61.45
1992	73.27	59.22	57.12	59.79	51.67
1993	79.76	73.50	54.39	66.67	50.51
1994	73.11	59.28	41.03	56.20	40.75
1995	83.05	71.64	45.36	75.74	43.07
1996	89.20	81.63	63.29	91.24	61.97
1997	100.06	100.08	100.21	100.07	100.21
1998	100.15	97.40	103.37	91.43	124.64
1999	95.91	86.65	287.55	86.28	134.28
2000	102.08	92.45	144.27	90.34	163.81
2001	92.42	73.52	54.46	75.59	149.01
2002	102.45	89.25	80.95	82.27	225.36

Source: Central Bank of Turkey, Electronic Data Delivery System (http://www.tcmb.gov.tr)

Table C4. Value Added per Employee (in thousands of ECUs/Euros)

1993	1994	1995	1996	1997	1998	1999	2000
9.3	5.6	7.4	6.5	7.7	7.4	7.9	10.0

Source: State Institute of Statistics (http://www.die.gov.tr)

Table C5. Changes in the Contribution of Regions to Real GDP, 1983-1997

Region	1983	1997
Aegean	16.5	16.8
Black Sea	11.2	9.0
Central Anatolia	15.4	15.3
Eastern Anatolia	4.5	3.3
Marmara	37.1	38.2
Meditarrenean	11.4	12.1
Southeastern Anatolia	3.9	5.3

Source: Özötün, E. (1999). *Türkiye Gayri Safi Yurtiçi Hasılası* (*İller İtibariyle*), Ankara: SIS. (http://www.dpt.gov.tr/bgyu/bg83-97.html#t4)

Table C6. Per Capita Real Income by Regions and Annual Growth Rates
(in millions of TL at 1987 prices and %)

Region	1983	1997	Growth Rate
Aegean	1476	2172	2.8
Black Sea	827	1271	3.1
Central Anatolia	1003	1616	3.5
Eastern Anatolia	517	683	2.0
Marmara	2038	2618	1.8
Meditarrenean	1138	1657	2.7
Southeastern Anatolia	565	952	3.8

Source: Özötün, E. (1999). *Türkiye Gayri Safi Yurtiçi Hasılası* (*İller İtibariyle*), Ankara: SIS. (http://www.dpt.gov.tr/bgyu/bg83-97.html#t5)

Table C7. Contribution of Regions to Sectoral GDP, 1997 (%)

Region	Agriculture	Industry	Services	Overall GDP
Aegean	20.4	15.2	16.7	16.8
Black Sea	14.5	7.3	8.6	9.0
Central Anatolia	15.6	10.6	17.7	15.3
Eastern Anatolia	6.3	2.2	3.1	3.3
Marmara	13.6	51.8	36.9	38.1
Meditarrenean	18.0	8.7	12.5	12.1
Southeastern Anatolia	11.7	4.1	4.5	5.3

Source: State Planning Organisation, *Eighth Five Year Plan*.

Table C8. Output Growth Rates by Regions, 1987-1997 (% per year)

Region	Agriculture	Industry	Services	Regional GDP
Aegean	*1.2	**4.6	**5.2	4.3
Black Sea	*0.1	**4.4	**4.1	3.2
Central Anatolia	*-0.2	**6.1	**3.3	3.2
Eastern Anatolia	*0.7	**3.1	**2.1	1.9
Marmara	*-0.3	**6.3	*4.8	5.0
Meditarrenean	*2.5	*3.6	**5.3	4.3
Southeastern Anatolia	**5.3	**5.0	*3.6	4.4

Source: State Planning Organisation, *Eighth Five Year Plan*.
* Sectoral output in the region grows slower than regional GDP
** Sectoral output in the region grows faster than regional GDP

Table C9. 3-Digit SITC Product Groups Covered

under "Technology Intensive Products" by Kotan and Sayan (2002)

522	Inorganic chemicals, oxides	751	Office machines
523	Other inorganic chemicals	752	Automatic data processing (ADP) equipment
531	Synthetic dye, nat. indigo, lakes n.e.s.	759	Office, ADP mach. parts, accessories
541	Medicinal, pharmaceutical products	761	Television receivers
562	Manufactured fertilizers	762	Radio broadcast receivers
582	Products of condensation etc.	763	Sound recorders, phonograph
583	Polymerization products etc.	764	Telecomm. equip., parts, accessories
591	Pesticides, disinfectants	771	Electric power machinery n.e.s.
711	Steam boilers and aux plant	772	Switch gear etc., parts n.e.s.
712	Steam engines, turbines	773	Electrical distributing equipment
713	Internal combustion piston engines	774	Electro-medical, X-ray equipment
714	Engines and motors n.e.s.	775	Household type equipment n.e.s.
716	Rotating electrical plant	776	Transistors, valves, etc.
718	Other power generating equipment	778	Electrical machinery n.e.s.
721	Agricultural machinery excluding tractors	792	Aircraft etc.
722	Tractors non-road	871	Optical instruments
723	Civil engineering equipment etc.	872	Medical instruments
724	Textiles, leather machinery	873	Meters and counters n.e.s.
725	Paper mill machinery etc.	874	Measuring, controlling instruments
726	Printing, book-binding machinery etc.	881	Photo apparatus, equipment n.e.s.
727	Food-machinery, non-domestic	882	Photo, cinema supplies
728	Other machinery for specialized industry	883	Developed cinema film
736	Metalworking machinery-tools	884	Optical goods n.e.s.
737	Metalworking machinery n.e.s.	885	Watches and clocks

Table C10. Current Value (millions of ECUs/Euros) and Growth Rate of Investment relative to the Previous Period (%)

Year	Value of Investment	Growth Rate
1990	26,955	15.9
1991	29,100	0.4
1992	28,972	6.4
1993	40,847	26.4
1994	26,750	-16.0
1995	31,810	9.1
1996	36,849	14.1
1997	45,296	14.8
1998	44,475	-3.9
1999	38,882	-15.7
2000	49,508	16.9
2001	31,110	-31.7

Source: State Planning Organisation (Data in Tables 1.12-1.13 at http://ekutup.dpt.gov.tr/ekonomi/gosterge/tr/1950-01/ converted to ECUs/Euros)

Table C11. Economic/Financial Indicators for Telecom Services in Turkey 1999

Indicator	Value	
Total Revenue	US$ 4.8 billion	Euro 4.5 billion
Revenue per Capita*	US$ 74.3	Euro 70,0
Revenue/GDP**	3.1%	
Total Investment	US$ 575 million	Euro 540 million
Investment per Capita*	US$ 8.9	Euro 8.3
Investment /GDP*	1.2%	
Exports of Equipment	US$ 60 million	Euro 56 million
Imports of Equipment	US$ 1.8 billion	Euro 1.7 billion

Source: Reported by Saygi (2002) based on ITU figures.
***** Much lower than European and World averages
** Higher than European and World averages

Table C12. Market Shares of ISP's by Regions in Turkey 2002

Regions	*Number of ISP's*
Superonline	26
TTNET	25
E-Kolay	19
Vestel Net	16
Total for Top 4 ISP's	86
Is Net	4
Turk Net	3
Others	7
Overall Total	100

Source: Gungor and Evren (2002).

Table C13. Distribution of ISP's by Regions in Turkey 2002

Regions	*Number of ISP's*
Aegean Region (Izmir)	3
Central Anatolia	12
Ankara	9
Eskisehir	1
Konya	2
Marmara Region (Istanbul)	34
Turkey	49

Source: Gungor and Evren (2002).

Table C14. Trade in ITC Products (millions of dollars)

SITC, Rev.3 Category	1997	1998	1999	2000	2001
ITC Exports					
75 Office machines and automatic data processing	28.8	42.6	60.0	63.1	52.4
76 Telecommunications and sound recording and reproducing apparatus and equipment	458.6	846.2	753.0	944.5	987.3
77 Electrical machinery, apparatus and appliances, n.e.s. and electrical parts thereof	1,007.1	1,050.6	1,017.7	1,163.0	1,426.1
ITC Imports					
75 Office machines and automatic data processing	913.1	1,061.6	1,206.9	1,594.7	781.1
76 Telecommunications and sound recording and reproducing apparatus and equipment	1,162,0	1,556.2	2,348.6	3,009.8	1,206.1
77 Electrical machinery, apparatus and appliances, n.e.s. and electrical parts thereof	2,563.5	2,795.6	2,553.0	2,898.8	2,142,5

Source: SIS.

Table C.15. ICT Companies within the Top 500 by Net Sales (2001)

Company	Rank	Activity Areas	Net Sales (in EUR million)	Ownership Structure
ARCELIK	5	Consumer electronics including ICT equipment and home appliances	865.15	D/Pr
VESTEL ELEKTRONIK	9	Consumer electronics including ICT equipment and home appliances	773.30	D/Pr
BEKO ELEKTRONIK	17	Consumer electronics including ICT equipment and home appliances	369.42	D/Pr
BOSCH	27	Consumer electronics including ICT equipment and home appliances	275.32	J/Pr
SIEMENS	29	Consumer electronics including ICT equipment and home appliances, Software and ICT services	259.19	J/Pr
ASELSAN ELEKTRONIK	35	Defence related electronic communication equipment and systems	233.18	D/Pu
PROFİLO TELRA ELEKTRONİK	38	Consumer electronics including ICT equipment and home appliances	211.72	D/Pr
ALCATEL TELETAŞ TELEKOMÜNİKASYON ENDÜSTRİ	42	Telecommunications equipment, infrastructure and services	197.98	J/Pr
VESTEL KOMÜNİKASYON	75	Telecommunications equipment and services	141.38	D/Pr
HES HACILAR ELEKTRİK	101	Telecommunications cables and wiring	115.26	D/Pr
HESFİBEL FİBER OPTİK VE ELEKTRONİK	217	Telecommunications cables and wiring, fibre-optic cable production and installation; Electronic	57.32	D/Pr
HAVELSAN HAVA ELEKTRONİK	366	Avionics systems, Information systems and technologies, Electronic warfare and simulation systems and technologies, Defence and security systems	35.19	D/Pu
TURK TELEKOM ISTANBUL PLANT	440	Telecommunications equipment and infrastructure	29.15	D/Pu

(http://www.iso.org.tr/_inghtml/ingsiteindex.html).

D : Domestically owned;
J : Joint venture;
Pr: Private;
Pu: Public

Table C.16. ICT Companies within the Top 10 Exporters (2002)

Company	Rank	Activity Areas	Value of Exports (in Millions of USD)	Ownership Structure
VESTEL ELEKTRONIK	1	Consumer electronics including ICT equipment and home appliances	783.81	D/Pr
BEKO ELEKTRONIK	5	Consumer electronics including ICT equipment and home appliances	448.25	D/Pr
BOSCH	9	Consumer electronics including ICT equipment and home appliances	311.70	J/Pr

D : Domestically owned;
J : Joint venture;
Pr: Private;
Pu: Public

Table C.17. ICT Companies within the Top 10 Employers (2002)

Company	Rank	Activity Areas	Number of Employees in 2002 (in Millions of USD)	Ownership Structure
ARCELIK	9	Consumer electronics including ICT equipment and home appliances	6,275	D/Pr

D : Domestically owned;
Pr: Private;

Table C.18. Foreign Investment in ICT Related Sectors, June 2003

Sector	Share of Sectoral Foreign Capital in Total Foreign Capital Invested in Turkey (%)	Share of Foreign Capital in Total Capital Invested In the Sector (%)
Electrical Machinery	2.42	82.00
Electronics	1.82	56.94

Source: Turkish Treasury (http://www.hazine.gov.tr/stat/yabser/ybsyeniturk.htm)

Table C.19. ICT Forecasts

Year	Fixed-Lines		Mobile Phones		PCs		Internet Users	
	Number (millions)	**Density** (%)	**Number** (millions)	**Density** (%)	**Number** (millions)	**Density** (%)	**Number** (millions)	**Density** (%)
1998	17.07	26.03	3.53	5.56	1.71	2.76	0.45	1.16
1999	18.18	27.57	8.18	10.00	2.21	3.23	1.51	1.98
2000	18.56	29.06	15.25	17.04	2.80	3.75	2.53	3.06
2001	20.51	30.48	18.05	26.82	2.90	4.31	2.93	4.35
2002	21.75	31.84	26.07	38.16	3.36	4.91	3.96	5.80
2003	22.98	33.13	33.89	48.88	3.85	5.55	5.07	7.32
2004	24.19	34.36	40.26	57.19	4.38	6.23	6.22	8.84
2005	25.38	35.51	44.83	62.72	4.98	6.93	7.36	10.30
2006	26.55	36.60	47.90	66.03	5.56	7.67	8.47	11.67
2007	27.71	37.62	50.00	67.89	6.21	8.43	9.51	12.91
2008	28.84	38.58	51.50	68.89	6.89	9.21	10.48	14.02
2009	29.95	39.47	52.69	69.42	7.60	10.01	11.37	14.99
2010	31.05	40.30	53.70	69.70	8.34	10.82	12.19	15.82
2011	32.12	41.07	54.62	69.84	9.11	11.65	12.93	16.53

Source: Saygi (2002).

D. PRESENCE OF THE MOST RELEVANT ECONOMIC ACTIVITIES FOR IST APPLICATIONS

Table D1. ICT Expenditures in Turkey

	1995	2001
Total ICT Expenditures ($, million)	2,777.0	9,313.0
ICT Expenditures as % of GDP	1.6	3.6
ICT Expenditures per capita ($)	44.4	142.7

Source: World Bank Development Data Group.

Table D2. Fixed Capital Investment by Sector

	2000 (At 1998 Prices Trillion TL.)			2000-2005 Annual Average Change (%)			2001-2005 Period Sectoral Distribution (Current Prices, %)		
	Public	Private	Total	Public	Private	Total	Public	Private	Total
Agriculture	179,1	275,7	454,8	11,5	5,8	8,2	5,3	3,2	3,9
Mining	41,1	99,1	140,2	0,2	-9,4	-6,2	1,1	0,8	0,9
Manufacturing	143,1	1504,1	1647,2	-19,8	10,2	8,7	1,8	20,4	14,3
Energy	542,1	187,6	729,6	10,5	16,4	12,1	18,0	2,9	7,8
Transportations-Communication	791,0	1138,8	1929,8	5,6	11,2	9,1	20,3	16,7	17,9
Tourism	12,2	417,9	430,1	2,3	12,9	12,7	0,2	6,8	4,6
Housing	29,4	3838,5	3867,8	-35,8	2,9	2,8	0,1	42,5	28,8
Education	422,7	122,8	545,5	14,6	23,5	16,9	15,0	2,6	6,6
Health	132,2	211,5	343,7	11,0	9,1	9,8	5,4	2,9	3,7
Other Services	370,9	344,8	715,7	10,2	-27,1	-1,2	6,5	1,3	3,0
Investment Workmanship	310,0	-	310,0	5,3	-	5,3	5,2	-	1,7
Local Administrations	877,0	-	877,0	5,3	-	5,3	21,0	-	6,8
Total	3850,8	8140,8	11991,5	7,5	6,5	6,8	100,0	100,0	100,0

Table D3. Economic/Financial Indicators for Telecom Services in Turkey 1999

Indicator	*Value*	
Total Investment	US$ 575 million	EUR 540 million
*Investment per Capita**	US$ 8.9	EUR 8.3
*Investment /GDP**	1.2%	

Source: Reported by Saygi (2002) based on ITU figures.

Table D.4. Comparative R&D indicators

Country or Group	R&D Exp. as % of GDP	R&D Exp. in Bus. Sector % of Total	R&D Performed by Bus. Sector of Total	R&D Exp. in Gov. Sector % of Total	R&D Performed by Uni. Sector of Total	Sci. and Eng. in R&D per 1000 Employee	Trt. Stud. In Sci. Math. And Eng % of Total Tert.	Number of Publications 2002		
	1991-2001	**1991-2001**	**1991-2001**	**1991-2001**	**1991-2001**	**1991-2001**	**2001**	**1981**	**1995**	**2002**
Finland	3.37	70.30	70.90	26.20	17.8	15.2	27.7	2 615	5 732	8 004
USA	2.82	68.30	74.40	26.90	14.2	8.6	8.9	174 123	249 386	314 109
Korea	2.65	73.40	71.20	23.90	14.2	5.2	33.9	234	5 393	18 430
Ireland	2.90	64.10	64.10	21.80	21.2	5.1	13.7	881	1 891	3 345
Israel	2.54	59.30	70.90	29.90	18.4	4.8*	16.1	4 934	8 279	10 431
Spain	0.97	49.70	54.30	38.60	29.4	4.9	17.6	3 462	15 367	26 960
Greece	0.67	24.20	28.50	48.70	49.5	3.8	ND	968	3 158	6 193
Portugal	0.76	21.30	35.80	69.70	38.6	3.2	15.1	237	1 580	4 170
Malaysia	0.37	44.70	ND	55.30	ND	0.9	ND	229	587	1 001
Mexico	0.43	29.60	25.50	61.30	26.3	0.6	15.5	907	2 901	5 756
Thailand	0.20	9.40	ND	85.50	30.6*	1.0*	21.0*	373	649	1 823
TURKEY	0.64	42.90	33.40	50.60	60.4	1.1	21.4	378	2 471	9 303
Brazil	0.91	40.10	45.50	57.20	43.50	1.7*	23*	1 913	5 440	14 999
India	0.74	27.90	ND	52.00	ND	1.5*	25.0*	13 623	14 883	20 409
High Inc. OECD Ave.	2.24	64.20	69.50	38.50	17.20	6.40				

SOURCE: Guruz and Pak (2003).

Table D.5. Foreign investment in R&D activities, June 2003

Sector	**Number of Firms with Foreign Partners**	**Share of Sectoral Foreign Capital in Total Foreign Capital Invested in Turkey (%)**	**Share of Foreign Capital in Total Capital Invested In the Sector (%)**
R&D Activities	15	0.05	88.87

Source: Turkish Treasury (http://www.hazine.gov.tr/stat/yabser/ybsyeniturk.htm)

Table D.6. Total R&D personnel by sector and education level, 1996-1999 averages

Education level	Total		Businesses		Government		Higher Education	
	Total	Full Time Employees	Total	Full Time Employees	Total	Full Time Employees	Total	Full Time Employees
Total								
1996	**58 336**	**21 995**	**6 174**	**4 293**	**7 223**	**4 415**	**44 939**	**13 287**
1997	**63 601**	**23 432**	**9 163**	**5 632**	**7 280**	**4 369**	**47 158**	**13 431**
1998	**62 181**	**22 892**	**9 003**	**5 223**	**6 090**	**3 879**	**47 088**	**13 790**
1999	**66 330**	**24 267**	**9 576**	**5 614**	**6 116**	**4 032**	**50 638**	**14 621**
Ph.D. or above								
1996	20 362	6 507	205	153	653	528	19 504	5 826
1997	21 862	6 824	236	165	679	498	20 947	6 161
1998	23 009	7 274	277	199	625	484	22 107	6 591
1999	25 021	7 730	303	215	658	521	24 060	6 994
M.S.								
1996	19 596	6 834	1 016	828	1 091	810	17 489	5 196
1997	20 279	6 668	1 061	796	1 188	874	18 030	4 998
1998	19 001	6 555	1 013	752	1 165	898	16 823	4 905
1999	20 076	6 969	1 168	887	1 171	935	17 737	5 147
B.S.								
1996	11 830	5 201	2 246	1 753	1 638	1 183	7 946	2 265
1997	13 340	5 785	3 209	2 210	1 950	1 303	8 181	2 272
1998	12 893	5 536	3 422	2 266	1 313	976	8 158	2 294
1999	13 751	5 856	3 608	2 359	1 302	1 017	8 841	2 480
More than High School								
1996	941	606	660	416	281	190	-	-
1997	1 363	818	1 026	631	337	187	-	-
1998	1 465	868	1 058	640	407	228	-	-
1999	1 536	896	1 084	646	452	250	-	-
High School								
1996	3 138	1 606	1 374	830	1 764	776	-	-
1997	3 310	1 761	1 992	1 128	1 318	633	-	-
1998	2 980	1 425	1 889	881	1 091	544	-	-
1999	3 177	1 596	2 105	1 038	1 072	558	-	-
Other								
1996	2 469	1 241	673	313	1 796	928	-	-
1997	3 447	1 576	1 639	702	1 808	874	-	-
1998	2 833	1 234	1 344	485	1 489	749	-	-
1999	2 769	1 220	1 308	469	1 461	751	-	-

Source: State Institute of Statistics (http://www.die.gov.tr/IstTablolar/26ag436t.xls)

E. INFORMATION SOCIETY TECHNOLOGIES (IST) PENETRATION

Table E1. Information Society Indicators 1999/2001 (in millions)

	Turkey	**CC**	**EU-15**	**USA**	**World**
Number of PCs (Dec. 2000)	**3**	**11**	**108**	**161**	**442**
-per 100 inhabitans	4.5	6	25	59	8
Internet hosts (July 2001)	**0.1**	**0.7**	**12**	**79**	**107**
-per 100 inhabitans	0.2 (2000)	1	3.3	29	2
Internet users (Dec. 2000)	**2**	**10**	**91**	**154**	**352**
-per 100 inhabitans	3	6	24	56	6
Mobile phone subscriptions (Dec. 2000)	**16**	**38**	**236**	**100**	**720**
-per 100 inhabitans	24.2	22	63	36	12

Source: Deiss (2001).

Table E2. Cell Phone Subscriptions

	Number of mobile phone subscriptions at the end of the year (1 000)				Growth (%)	Number of mobile phone subscriptions per 100 inhabitants			
	1 995	1 998	1 999	2 000	2000/1999	1995	1998	1999	2000
Bulgaria	20	127	350	738	110,9	0,2	1,5	4,3	9,0
Cyprus	44	116	151	218	44,6	6,0	15,5	20,1	32,7
Czech Republic	49	965	1 944	4 346	123,6	0,5	9,4	18,9	42,3
Estonia	30	247	387	557	43,9	2,0	17,0	26,8	38,7
Hungary	265	1 070	1 628	3 000	84,3	2,6	10,6	16,1	29,9
Latvia	15	168	274	401	46,5	0,6	6,8	11,2	16,6
Lithuania	14	268	332	524	57,8	0,4	7,2	9,0	14,2
Malta	11	23	37	114	209,2	3,0	6,1	9,6	29,5
Poland	75	1 928	3 956	6 747	70,6	0,2	5,0	10,2	17,5
Romania	9	643	1 400	2 499	78,5	0,0	2,9	6,2	11,1
Slovakia	12	465	918	1 294	40,9	0,2	8,6	17,0	24,0
Slovenia	27	196	614	1 086	76,9	1,4	9,9	31,0	54,6
Turkey	437	3 506	8 122	16 133	98,6	0,7	5,3	12,2	24,2
TOTAL CC	**1 008**	**9 722**	**20 113**	**37 658**	**87,2**	**0,6**	**5,6**	**11,7**	**21,8**
EU-15	21 160	90 145	146 579	235 745	60,8	5,7	24,1	39,1	62,6

Sources : *ITU* *Data for Slovenia in 1995: Eurostat;*

Source: Deiss (2001).

Table E3. PC Use in the Candidate Countries and EU-15

Total number of PCs (1 000)					Growth 1998-99 (%)	Number of PCs Per 100 inhabitants				Share of all PCs used (% in 1999)	
	1990	1998	1999	2000		1990	1998	1999	2000	Households	Businesses
Bulgaria	-	200	220	361	10.0	-	2.4	2.7	4.4	7	93
Cyprus	5	94	130	-	38.3	0.7	12.6	17.3	-	48	52
Czech R.	120	1 000	1 100	1 342	10.0	1.2	9.7	10.7	13.1	24	76
Estonia	100	165	195		18.2		11.3	13.5	-	61	39
Hungary	-	660	750	870	13.6	1.0	6.5	7.4	8.7	30	70
Latvia	-	150	200		33.3		6.1	8.2	-	14	86
Lithuania	-	200	220		10.0		5.4	5.9	-	32	68
Malta	5	60	70	80	16.7	1.4	15.9	18.1	20.6	-	-
Poland	300	1 900	2 400	2 670	26.3	0.8	4.9	6.2	6.9	23	77
Romania	10	480	600	713	25.0	0.0	2.1	2.7	3.2	32	68
Slovakia	-	350	400		14.3		6.5	7.4		25	75
Slovenia	-	420	500	548	19,0		21.2	25.3	27.6	54	46
Turkey	300	1 550	2 200	3 000	41,9	0.4	2.3	3.3	4.5	-	-
Total CC	-	**7 229**	**8 985**	**11 000**	**24,3**		**4.2**	**5.2**	**6.4**	**46**	**54**
EU-15	25 400	84 725	93 200	107 830	10,0	7.0	22.6	24.8	28.6	-	-

Source: Deiss (2001)

Table E4. Number of Internet Users in the Candidate Countries and EU-15

	Number of Internet users (1 000)			Growth 1999/2000 (%)	Number of Internet users per 100 inhabitants		
	1998	1999	2000		1998	1999	2000
Bulgaria	150	235	430	83.0	1.8	2.9	5.2
Cyprus	68	88	120	36.4	9.1	11.7	18.0
Czech Republic	400	700	1 000	42.9	3.9	6.8	9.7
Estonia	150	200	366	83.0	10.3	13.8	25.4
Hungary	400	600	715	19.2	3.9	5.9	7.1
Latvia	80	105	150	42.9	3.3	4.3	6.2
Lithuania	70	103	*150*	45.6	1.9	2.8	4.1
Malta	25	30	40	33.3	6.6	7.8	10.3
Poland	1 580	2 100	2 800	33.3	4.1	5.4	7.2
Romania	500	600	800	33.3	2.2	2.7	3.6
Slovakia	500	600	650	8.3	9.3	11.1	12.0
Slovenia	200	250	300	20.0	10.1	12.6	15.1
Turkey	450	1 500	2 000	33.3	0.7	2.2	3.0
TOTAL CC	**4 573**	**7 111**	**9 521**	**33.9**	**2.6**	**4.1**	**5.5**
EU-15	34 506	55 942	91 285	63.2	9.2	14.9	24.2

Source: Deiss (2001)

Table E5: Data for Turkish Telecommunication Network and Mobile Services

	1997	1998	1999	2000	2001
Population	62,866,000	63,926,000	64,848,000	65,700,000	68,610,000
Household	13,200,000	14,000,000	14,202,000	14,400,000	15,086,158
Main telephone lines in operation	15,744,000	16,960,000	18,060,000	18,395,000	18,904,000
Digital Mobile Phone	1,483,000	3,382,000	8,000,000	16,041,000	18,229,000
% digital mainlines	81.6	82.9	84	87.3	88.8
% of residential mainlines	74.1	75	74.8	75.9	76.3
Residential mainline per 100 households	88.3	90.9	95.1	97	95.6
Cable TV Subsriber	512,000	611,000	734,000	883,000	908,662

Source: Turk Telekom and International Telecommunication Union (ITU) database

Table E6. Main Telecommunications Indicators for the Period of 2001-2003

Indicators	2001	2002	2003 (estimated)
PSTN Exchange	21 341 000	21 841 000	21 941 000
PSTN Subscribers	18 904 000	19 000 000	19 100 000
PSTN Penetration *(%)*	27,3	27	26,7
Mobile Phone			
Analog (NMT 450)	69 971	54 971	40 000
Digital (GSM)	18 229 000	25 000 000	28 000 000
Mobile Phone	26,5	35,6	39,3
Number of Payphones	71 149	74 055	83 925
Fiber/Optic Lines	77 340	81 340	84 340
Cable TV Subscribers	908 662	950 000	1 050 000
Number of Internet	2 500 000	4 000 000	6 000 000

Source: SPO, Turk Telekom

Table E7. Overview of the economic indicators by sectors

	1999	2000	2001	2002	2003*
GROSS NATIONAL PRODUCT (GNP)					
At current prices ($ Million)	185.267	200.002	145.693	180.892	239.235
GNP Per capita ($)	2.879	2.965	2.123	2.598	3.383
GNP - RATE OF GROWTH BY SECTORS (%)					
Agriculture	-5,6	3,8	-6,0	7,4	-2,4
Industry	-5,1	5,6	-7,4	7,9	7,3
Services	-3,9	6,5	-6,1	6,0	5,1
GNP	-6,1	6,3	-9,5	7,9	5,9
GDP COMPOSITION BY SECTORS (%)					
Agriculture	16,0	15,4	12,8	13,0	13,4
Industry	19,0	20,0	21,1	19,7	18,5
Services	64,9	64,6	66,1	67,3	68,2
PRODUCTION					
Value Added in Agriculture at 1987 prices (TL Billion)	15.426	15.962	14.994	15.978	15.549
Value Added in Industry at 1987 prices (TL Billion)	31.814	33.738	31.194	34.142	36.793
Production index of manufacturing Industry (1997=100)	95,9	102,1	92,4	102,5	112,1
Capacity utilization in manufacturing Industry (Weighted average)	72,4	75,9	70,9	75,4	78,4
FIXED INVESTMENTS (TL Billion)	16.863.755	27.688.468	32.408.981	46.031.221	61.179.859
Public (TL Billion)	4.435.215	7.983.004	10.047.332	15.880.805	14.969.350
Private (TL Billion)	12.428.540	19.705.464	22.361.649	30.150.416	46.210.509
EMPLOYMENT					
Civilian labour force (1000 persons)	22.925	22.031	22.269	24.347	23.206
Civilian employment (1000 persons)	21.236	20.579	20.367	21.658	20.811
Agriculture	8.595	7.103	7.217	7.618	6.799
Industry	3.664	3.738	3.734	3.953	3.836
Services	8.976	9.738	9.416	10.086	10.176

* *Provisional*

Source: Undersecretariat of Foreign Trade

Table E8. ICT Ownership in Turkey (Urban households – 1998)*

Type of ICT	**Household** (%)	**Personal** (%)	**Business** (%)
TV	96.1	--	--
Radio	90.9	--	19.0
Fixed-line Telephone	81.8	--	53.7
Computer	6.5	--	11.3
Answering Machine	5.8	--	5.4
Facsimile	1.5	--	10.1
Internet Connection	1.2	--	1.9
Cellular	--	10.1	--
Pager	--	2.5	--

Source: MTC (1999), TUENA Survey 1998.

* The numbers in the columns show the percentage of individuals reporting the type of their ICT use in response to survey questions. So, the numbers in the last column should not be taken to imply that only 10.1% of the businesses have a facsimile, or only 11.3% of them have a computer. The numbers imply, instead, that 11.3% of individuals surveyed reported to own a computer for business use (perhaps in addition to one they have at home).

Table E9. Distribution ICT Ownership by Socio-Economic Status 1998 (%)

Type of ICT	Lowest 20%	Lower 20%	Middle 20%	Upper 20%	Top 20%
Home Computer	2.9	7.4	12.4	24.8	52.5
Fixed-line Phone	13.7	19.5	21.0	22.4	23.4

Source: MTC (1999), TUENA Survey 1998.

Table E10. The Use of Advanced Services by Socio-Economic Status 1998 (%)

Services	Lowest 20%	Lower 20%	Middle 20%	Upper 20%	Top 20%
Automatic Wake-up Calls	10.1	10.6	19.5	24.2	35.6
Call Forwarding	11.1	11.1	16.5	23.0	38.3
Banking Services	11.1	10.7	14.4	23.0	40.7
Audiotext Services	6.4	16.6	17.6	20.8	39.2

Source: MTC (1999), TUENA Survey 1998.

Table E11. Potential Demand for National Information Infrastructure Services 1998

Services	Readiness to Use (%)	Rank
Finding out about and paying telephone, tax, water, etc. bills	82.6	1
Submitting petitions and receiving answers	75.5	2
Booking and receiving tickets	73.5	3
Cinema, music and other cultural events	73.2	4
Exchanging information	73.2	4
Participating in debates and votes	69.6	5
Receiving a lycée/university diploma or a course certificate	66.8	6
Access to libraries, museums and art galleries	64.9	7
Viewing and buying goods	62.0	8
Making bank and stock exchange transactions	58.5	9
Loading job applications	57.2	10

Source: MTC (1999), TUENA Survey 1998.

Table E12a. TV Ownership by Income in Turkey 2000

Income Group	Share in Total Surveyed	Share of Households Owning a TV (%)	
		Within the Income Group	Within the Total
Low Income	41.9	94.4	39.6
Lower Middle Income	33.1	98.7	32.7
Middle Income	14.4	99.4	14.3
Upper Middle Income	7.9	100.0	7.9
High Income	2.8	96.2	2.7
Overall	**100.0**	**96.9**	

Source: TUBITAK-Bilten (2001).

Table E12b. TV Ownership by Regions in Turkey 2000

Regions	**Ownership Rate** (%)	**Rank**
Aegean Region	97.5	2
Black Sea Region	97.6	1
Central Anatolia	97.6	1
Eastern Anatolia	94.8	4
Marmara Region	97.3	3
Mediterranean Region	97.5	2
Southeastern Anatolia	94.3	5
Turkey	**96.9**	-

Source: TUBITAK-Bilten (2001).

Table E13a. Pay-TV Subscriptions by Income in Turkey 2000

Income Group	Share in Total Surveyed	**Share of Households with Subscriptions to Pay-TV Channels** (as % of Total)
Low Income	41.9	0.3
Lower Middle Income	33.1	2.4
Middle Income	14.4	4.8
Upper Middle Income	7.9	17.5
High Income	2.8	18.7
Overall	**100.0**	**4.2**

Source: TUBITAK-Bilten (2001).

Table E13b. Pay-TV Subscriptions by Regions in Turkey 2000

Aegean Region	2.9	4
Black Sea Region	7.5	1
Central Anatolia	3.2	3
Eastern Anatolia	-	7
Marmara Region	6.7	2
Mediterranean Region	1.5	5
Southeastern Anatolia	1.3	6
Turkey	**4.2**	-

Source: TUBITAK-Bilten (2001).

* In addition, about 1% of the individuals surveyed reported to have subscribed to one or more of the digital broadcasting channels.

Table E14. Cable TV Subscriptions by Regions in Turkey 2000

Regions	**Subscription Rate** (%)	**Rank**
Aegean Region	10	3
Black Sea Region	10	3
Central Anatolia	12	2
Eastern Anatolia	6	5
Marmara Region	16	1
Mediterranean Region	7	4
Southeastern Anatolia	-	6
Turkey	**11**	-

Source: TUBITAK-Bilten (2001).

Table E15. Fixed-line Telephone Ownership by Income in Turkey 2000

Income Group	Share in Total Surveyed	**Share of Households Owning Fixed-line Phones** (%)	
		Within the Income Group	Within the Total
Low Income	41.9	79.3	33.2
Lower Middle Income	33.1	90.3	29.9
Middle Income	14.4	94.7	13.6
Upper Middle Income	7.9	94.4	7.5
High Income	2.8	97.4	2.7
Overall	**100.0**	**86.8**	

Source: TUBITAK-Bilten (2001).

Table E16a. Cell (Mobile) Phone Ownership by Income in Turkey 2000

Income Group	Share in Total Surveyed	**Share of Individuals* Owning a Cell Phone** (%)	
		Within the Income Group	Within the Total
Low Income	24.1	28.2	6.8
Lower Middle Income	35.4	42.6	15.1
Middle Income	21.5	51.9	11.2
Upper Middle Income	13.7	65.7	9.0
High Income	5.3	79.7	4.2
Overall	**100.0**	**46.2**	

Source: TUBITAK-Bilten (2001).

* On the basis of households, the ownership rate goes up to 50.2% with more than 17.8% of these households having more than one cell phone.

Table E16b. Cell (Mobile) Phone Ownership by Regions in Turkey 2000 (%)

Regions	**Ownership Rate** (%)	**Rank**
Aegean Region	46	4
Black Sea Region	53	2
Central Anatolia	52	3
Eastern Anatolia	36	6
Marmara Region	61	1
Mediterranean Region	42	5
Southeastern Anatolia	29	7
Turkey	**50**	-

Source: TUBITAK-Bilten (2001).

Table E16c. Cell (Mobile) Phone Ownership by Regions in Turkey

December 2002 (Millions)

Regions	**Ownership Rate** (%)	**Rank**
Aegean Region	3.183	3
Black Sea Region	1.833	5
Central Anatolia	4.014	2
Eastern Anatolia	0.943	7
Marmara Region	9.335	1
Mediterranean Region	2.706	4
Southeastern Anatolia	1.309	6
Turkey	**23.323**	-

Source: Turkish Telecommunications Authority (2003).

Table E17a. Home Computer Ownership by Income in Turkey 2000

Income Group	Share in Total Surveyed	**Share of Households Owning a Home Computer** (as % of Total)*
Low Income	41.9	2.0
Lower Middle Income	33.1	8.2
Middle Income	14.4	24.1
Upper Middle Income	7.9	43.7
High Income	2.8	64.7
Overall	**100.0**	**12.3**

Source: TUBITAK-Bilten (2001).

* The ratio of individuals reporting themselves as personal/home computer users is 17.1%.

Table E17b. Home Computer Ownership by Regions in Turkey 2000

Regions	**Ownership Rate** (%)	**Rank**
Aegean Region	11.2	4
Black Sea Region	13.6	2
Central Anatolia	13.1	3
Eastern Anatolia	9.1	5
Marmara Region	16.8	1
Mediterranean Region	7.3	6
Southeastern Anatolia	1.2	7
Turkey	**12.3**	-

Source: TUBITAK-Bilten (2001).

Table E17c. Reasons for Not Having a Computer at Home 2000

Regions	**Share** (%)	**Rank**
Price not affordable	58.3	1
Does not have a need for one at all	36.2	2
Uses the one at work and does not need one at home	2.8	3
Difficulty of use	1.0	5
Other	1.7	4
Total	100.0	

Source: TUBITAK-Bilten (2001).

Table E18. Ownership of Internet Access at Home by Income in Turkey 2000

Income Group	Share in Total Surveyed	**Share of Households Owning a Home Computer** (as % of Total)
Low Income	41.9	0.55
Lower Middle Income	33.1	3.90
Middle Income	14.4	12.02
Upper Middle Income	7.9	27.87
High Income	2.8	51.92
Overall	**100.0**	**7.0**

Source: TUBITAK-Bilten (2001).

Table E19. Ownership of Other ICT Equipment by Households in Turkey 2000

Regions	**Ownership Rate** (%)
Tape Recorder	76
CD Player	24
VCR	17
DVD Player	3
Palm Computer	2
Facsimile	2

Source: TUBITAK-Bilten (2001).

F. INSTITUTIONAL CAPACITIES AND REGULATORY BACKGROUND

There are no tables for Section F.

G. EDUCATIONAL SECTOR AND LABOUR FORCE SUPPLY

Table G.1. Enrolment at primary and secondary schools (in thousands)

No. of Students in Primary and Secondary Education	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Primary Schools[1]	6 862	6 879	6 708	6 526	6 467	6 403	6 389	9 084	9 609	10 028
General Secondary (Junior High) Schools[2]	2 109	2 117	2 243	2 303	2 319	2 296	2 270			
General High Schools[3]	799	894	991	1 078	1 156	1 201	1 158	1 166	1 283	1 387
Vocational Secondary (Junior High) and High Schools[4]	900	977	1 066	1 142	1 251	1 311	1 333	964	998	916

Source: State Institute of Statistics.
[1] Grades 1-5 until 1997; 1-8 after 1997
[2] Grades 6-8 until 1997
[3] Grades 9-11
[4] Grades 6-11 until 1997; 9-11 after 1997

Table G.2. Education indicators by levels of education in 2000-2001 Academic Year

Level of Education	Number of Schools	Number of Students			No. of Teachers
		Total	Boy	Girl	
PRE-SCHOOL EDUCATION	*8 996**	*228 503*	*120 428*	*108 075*	*12 265*
Public	*8 297**	*212 272*	*111 906*	*100 366*	*10 901*
Private	*699**	*16 231*	*8 522*	*7 709*	*1 364*
PRIMARY EDUCATION	36 047	10 289 233	5 520 004	4 769 229	345 001
Public	*35 329*	*10 102 965*	*5 417 126*	*4 685 839*	*330 811*
Private	*718*	*186 268*	*102 878*	*83 390*	*14 190*
SECONDARY EDUCATION	*5 967*	*2 128 957*	*1 240 579*	*888 378*	*134 815*
Public	*5 485*	*2 070 899*	*1 208 386*	*862 513*	*126 216*
Private	*482*	*58 058*	*32 193*	*25 865*	*8 599*

***** Number of classrooms
Source: Ministry of Education

Table G.3. Number of applicants for the Student Selection and Placement Examination and those placed in programmes of higher education 1999-1999 (in thousands)

No. of Students	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Number of those placed	196	200	260	414	371	384	412	445	426	414
Number of applicants	893	877	980	1 155	1 250	1 265	1 399	1 350	1 360	1 479

Source: Student Selection and Placement Center (OSYM).

Table G.4. Quantitative developments in education

	1995-1996		2000-2001		2000-2005*	
Level of Education	No. of Students ('000)	Enrol. Ratio (%)	No. of Students ('000)	Enrol. Ratio (%)	No. of Students ('000)	Enrol. Ratio (%)
Pre-School Education	*199*	*7.7*	*228*	*9.8*	*690*	*25.0*
Primary Education	*9 564*	*89.8*	*10 289*	*97.6*	*10 328*	*100.0*
Secondary Education	*2 223*	*55.0*	*2 218*	*59.4*	*2 886*	*75.0*
General Secondary Ed.	*1 277*	*31.6*	*1 324*	*36.6*	*1 539*	*40.0*
Voc.&Tech. Secondary Ed.	*946*	*23.4*	*805*	*22.8*	*1 346*	*35.0*
Higher Education*	1 226	23.8	1 492	27.8	2 002	37.3
Formal Education	*766*	*14.9*	*1 006*	*18.7*	*1 519*	*28.3*
Distance Education	*460*	*8.9*	*486*	*9.1*	*483*	*9.0*

Source: Ministry of Education (http://www.meb.gov.tr/stats/apk2001ing/Section_5/1CurrentSituationin.htm)

* Estimate

** Including Graduate Students

*** Students enrolled in Open University (see Section E)

Table G5. List of vocational high schools

(Each offering three different types of high school degrees after training their students to become technical support personnel in the field of computing)

Afyon Gazi Anadolu Teknik - Anadolu Meslek - Teknik ve Endüstri Meslek Lisesi
http://www.afyongazieml.com

Kızılcahamam Anadolu Teknik, Teknik, Endustri Meslek Lisesi ve Mesleki Eğitim Merkezi
http://katem.kolayweb.com

İstanbul Denizcilik ve Su Ürünleri Anadolu Meslek Lisesi, Teknik Lisesi, Meslek Lisesi
http://www.denizcilik.k12.tr

Niğde 75. Yıl Mehmet Göker Anadolu Tekstil Meslek Lisesi
http://nigdetekstil.kolayweb.com

Samsun Atakum Anadolu Teknik Lise, Teknik Lise ve Endüstri Meslek Lisesi
http://www.atakumeml.k12.tr

İstanbul Şişli Sanayi Odasi Vakfi İnşaat Anadolu.Teknik, Teknik ve Yapi Meslek Lisesi
http://www.isovyapimeslek.k12.tr

İzmir Bornova Seyit Şanlı Anadolu Teknik Lise, Teknik Lise ve Endüstri Meslek Lisesi
http://www.homestead.com/bormeslis

İstanbul Beşiktaş Anadolu Otelcilik ve Turizm Meslek Lisesi
http://iaotml.s5.com

Ankara Altındağ Yıldırım Beyazıt Kız Meslek ve Anadolu Meslek Lisesi
http://geocities.com/y_beyazit60

Bursa Nilüfer İslam Uyar Anadolu Ticaret ve Ticaret Meslek Lisesi
http://www26.brinkster.com/islamuy

İzmir Bornova Mimar Sinan Anadolu Teknik, Anadolu Endüstri Meslek, Teknik ve Endüstri Meslek Lisesi
http://www.bornovamimarsinan.com

İstanbul Zeytinburnu Anadolu Teknik, Anadolu Meslek, Teknik ve Endüstri Meslek Lisesi
http://www.zeytinburnueml.k12.tr

İzmir Buca Anadolu Teknik, Teknik ve Endüstri Meslek Lisesi
http://www.bucaeml.k12.tr

Bursa Nilüfer Mehmet Kemal Coşkunöz Anadolu Teknik Lisesi
http://www.coskunoz.com.tr/kctlisesi

İstanbul Büyükçekmece Borusan Asım Kocabıyık Anadolu Meslek Lisesi
http://www.bakaml.k12.tr

Çanakkale Anadolu Teknik Andadolu Meslek Teknik ve Endüstri Meslek Lisesi
http://www.geocities.com/ceml2001/

Burdur Anadolu Teknik, Teknik ve Endüstri Meslek Lisesi
http://www.burduratl.8m.com

Tuzla Süleyman Demirel Anadolu Ticaret ve Ticaret Meslek Lisesi
http://tuzlaticaret.cjb.net

Bursa Yenişehir Anadolu Ticaret ve Ticaret Meslek Lisesi
http://www.yticaretmeslek.netteyim.net

İstanbul Bayrampaşa Ticaret Odası Anadolu Teknik Lisesi
http://www.itoatl.net

Tokat Erbaa Kız Meslek ve Anadolu Kız Meslek Lisesi
http://www.ekmel.k12.tr

Denizli Şehit Öğretmen Yusuf Batur Anadolu Teknik ve Endüstri Meslek Lisesi
http://www.denizlieml.com

Yozgat Yerköy Anadolu Teknik, Teknik Lise ve Endüstri Meslek Lisesi
http://yerkoyendmesLisesidostweb.com

Kahraman Maraş Ticaret Meslek Lisesi ve Anadolu Ticaret Meslek Lisesi
http://www.marasticaret.k12.tr

Bolu Mengen Aşçılar Anadolu Otelcilik ve Turizm Meslek Lisesi
http://www.mengenascilaraotml.cjb.net

Balıkesir Ayvalık Endüstri Meslek ve Anadolu Meslek Lisesi
http://www.ayvalikeml.com

İstanbul Beykoz Şahinkaya Anadolu Teknik Anadolu Meslek ve Endüstri Meslek Lisesi
http://sahinkayameslek.lisesi.com

Ankara Altındağ Yıldırım Beyazıt Anadolu Teknik, Teknik ve Endüstri Meslek Lisesi
http://www.ankyildirimbeyaziteml.com/

Antalya Alanya Ümit Altay Anadolu Otelcilik ve Turizm Meslek Lisesi
http://www.aaotml.com.tr.tc

Kırıkkale Anadolu Tic. ve Tic. Meslek Lisesi
http://kkaleticaret.8m.com

Yalova Çiftlikköy Aksa Anadolu Teknik ve Endüstri Meslek Lisesi
http://www.aksaatml.com

Bolu İzzet Baysal Anadolu Teknik Lisesi, Teknik Lise ve Endüstri Meslek Lisesi
http://www.izzetbaysaleml.k12.tr

Bursa Yıldırım Ticaret Meslek ve Anadolu İletişim Meslek Lisesi
http://www.ytm.lisesi.com

Trabzon Anadolu Teknik Lisesi-Teknik Lise ve Endüstri Meslek Lisesi
http://www.trabzoneml.netfirms.com

Sivas Ticaret ve Anadolu Ticaret Meslek Lisesi
http://www.sivasticaretmesleklisesi.com

Kırklareli Lüleburgaz Meslek ve Anadolu Meslek Lisesi
http://www.lburgazaml.sayfasi.com

Hatay Dörtyol Anadolu Ticaret ve Ticaret Meslek Lisesi
http://www.hdtml.com

Balıkesir Bandırma Recep Gençer Anadolu Teknik, Anadolu Meslek ve Endüstri Meslek Lisesi
http://web.ttnet.net.tr/rgemlis

Mersin Tarsus Anadolu Teknik, Teknik ve Endüstri Meslek Lisesi
http://www.tarsuseml.8m.com

Ankara Altındağ Ulus Teknik Lise Anadolu Meslek ve Endüstri Meslek Lisesi
http://www.uluseml.com

Bartın Amasra Anadolu Otelcilik ve Turizm Meslek Lisesi
http://www.amasraotml.net

Kırklareli Lüleburgaz Ticaret ve Anadolu Ticaret Meslek Lisesi
http://web.ttnet.net.tr/latml

Yalova Anadolu Kız Meslek ve Meslek Lisesi
http://www.yalova-akml.k12.tr

Mersin Yahya Günsür Anadolu Bilgisayar Teknik Lisesi
http://www.yahyagunsur.gen.ms

Ordu Fatsa Anadolu Kız Meslek ve Kız Meslek Lisesi
http://www.fakml.8m.com

Kocaeli Gebze Lafarge Aslan Çimento Anadolu Teknik Teknik ve Endüstri Meslek Lisesi
http://www.aslaneml.lisesi.com

Aksaray Ticaret Meslek - Anadolu Ticaret Meslek Lisesi
http://www.atml68.lisesi.com

Konya Beyşehir Ticaret Meslek Lisesi ve Anadolu Ticaret Meslek Lisesi
http://kbtml.kolayweb.com

Muğla Bodrum Turgutreis Anadolu Otelvilik ve Turizm Meslek Lisesi
http://www.turgutreisaotml.com

Kayseri Melikgazi Seyyid Burhaneddin Anadolu Teknik Lisesi Teknik Lise ve Endustri Meslek Lisesi
http://www.sbeml.com

Tokat Anadolu Ticaret Meslek Lisesi ve Ticaret Meslek Lisesi
http://tokattml.topcities.com

Aksaray Anadolu Teknik Lisesi, Teknik Lise ve Endüstri Meslek Lisesi
http://www.atem68.cjb.net

Kütahya Gediz Anadolu Ticaret Meslek ve Ticaret Meslek Lisesi
http://www.gedizline.com

Yalova Anadolu Teknik, Teknik Lise ve Merkez Endüstri Meslek Lisesi
http://www.yalova-eml.com

Konya Beyşehir Ticaret Meslek ve Anadolu Ticaret Meslek Lisesi

http://kbtml.sitemynet.com

Düzce Merkez Ticaret Meslek ve Anadolu Tic. Meslek Lisesi
http://www.duzceticaretmesleklisesi.gen.tr

H. NATIONAL AND REGIONAL DEMOGRAPHIC DATA AND PROSPECTIVE

Table H.1. Population shares by age groups, 1997

Age Groups	%	%
00-04	10.54	
05-09	12.22	
10-14	12.20	55.00
15-19	11.01	
20-24	9.02	
25-29	8.52	
30-34	7.24	
35-39	6.18	30.77
40-44	4.94	
45-49	3.90	
50-54	3.58	
55-59	3.44	
60-64	2.86	12.60
65-69	1.76	
70-74	0.97	
75-79	0.78	
80-84	0.47	1.26
85+	0.01	

Source: State Institute of Statistics.

Table H.2. Annual population growth rates, 1990-2002

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1.97	1.94	1.91	1.88	1.85	1.83	1.81	1.79	1.75	1.71	1.66	1.61	1.57

Source: State Institute of Statistics.

Table H.3. Changes in age composition

	1995	2000*	2005*
Distribution of population by age groups			
0-14 Age Group (%)	32.84	30.04	28.27
15-64 Age Group (%)	62.13	64.39	65.84
65+ Age Group (%)	5.02	5.57	5.89

Source: Ministry of Education

** Estimate.*

Table H.4. Changes in shares of school age population

	1995	2000*	2005*
3-5 Age Group (%)	*6.36*	*5.89*	*5.89*
6-13 Age Group (%)	*17.98*	*15.85*	*14.63*
14-16 Age Group (%)	*6.60*	*6.29*	*5.53*
17-20 Age Group (%)	*8.15*	*8.28*	*7.68*

Source: Ministry of Education

** Estimate.*

I. CULTURAL AND SOCIOLOGICAL ASPECTS

Table I.1. Shares of sectors in Merchandise Exports, Real GDP and employment

Year	**Share of Agriculture in** (%)			**Share of Industry in** (%)			**Share of Services in** (%)		
	Real GDP	*Employment*	*Total Exports*	*Real GDP*	*Employment*	*Total Exports*	*Real GDP*	*Employment*	*Total Exports*
1980	25.1	60.0	57.4	22.3	13.0	42.6	52.6	27.0	42.6
1990	17.0	46.9	17.4	26.7	15.6	82.6	56.3	37.5	82.6
2000	13.4	34.9	7.2	28.4	18.1	92.8	58.2	46.9	92.8

Source: State Planning Organisation (SPO)

Table I.2. Various indicators related to labour force, urbanization and quality of life 2001

INDICATORS	**TURKEY**	**EUROPE & CENTRAL ASIA**	**LOWER MIDDLE INCOME**
Population mid year (millions)	66.2	475	2 164
GNI per capita (atlas method , US $)	2 530	1 960	1 240
AVERAGE ANNUAL GROWTH 1995-2001			
Population (%)	1.5	0.1	1.0
Labor force (%)	2.3	0.6	1.2
MOST RECENT ESTIMATE (latest year available, 1995-2001)			
Poverty (% of population below national poverty line)	…		
Urban population (% of total population)	66	63	46
Life expectancy at birth (years)	70	69	69
Infant mortality (per 1,000 live births)	34	20	33
Child malnutrition (% of children under 5)	8		11
Access to an improved water source (% of population)	83	90	80
Illiteracy (% of population age 15 +)	14	3	15
Gross primary enrolment (% of school-age population)	100	102	107
Male	104	103	107
Female	95	101	107

Source: World Bank.

Table I.3. Selected demographic indicators: 1950-1997

Year	**Total Population** (Thousands)	**Urban Population** [a] (Thousands) **[% Share]**	**Population Growth Rate** [b] (Annual, %)	**Urban Population Growth Rate** (Annual, %)
1950	20 947	3 036 **[14.5]**	2.20	
1955	24 065		2.81	
1960	27 755	6 215 **[22.4]**	2.89	1950-1960: 7.43
1965	31 391		2.49	1960-1970: 6.39
1970	35 605	11 551 **[32.4]**	2.55	
1975	40 348		2.53	1970-1975: 5.62
1980	44 737	18 825 **[42.1]**	2.09	1975-1980: 4.40
1985	50 664	23 926 **[47.2]**	2.52	1980-1985: 4.91
1990	56 473	30 516 **[54.0]**	2.19	1985-1990: 4.99
1997	62 866	40 881 **[65.0]**	1.54	1990-1995: 4.40 1995-2000: 4.67

Source: Compiled from SPO and SIS data by Sayan (2001).

[a] Number of people living in towns with a population of 20,000 or more (for 1997, provincial and county centres).

[b] As compared to the previous period.

Table I.4. Regional migration patterns between 1985 and 1990

Region	**Number of Immigrants Coming in (1)**	**Number of Emigrants Going out (2)**	**Net Immigration (+)/Emigration (-) Ratio* (‰)**
Aegean	564 679	-381 698	25.52
Black Sea	365 896	-793 984	-53.28
Central Anatolia	671 609	-821 715	-15.67
Eastern Anatolia	238 865	-671 255	-82.22
Marmara	1 525 195	-684 543	68.93
Mediterranean	487 276	-356 159	19.94
Southeastern Anatolia	211 653	-355 819	-30.33

Source: State Planning Organization, 1983-1997 Döneminde Bölgesel Gelişmeler [Regional Developments during the 1983-1997 Period] (http://www.dpt.gov.tr/bgyu/bg83-97.html - 1)