

COMPARISON OF INFORMATION AND COMMUNICATION POLICIES OF  
IRELAND AND TURKEY

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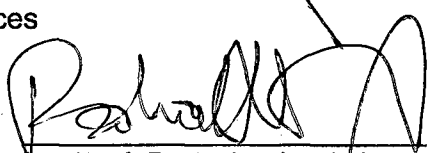
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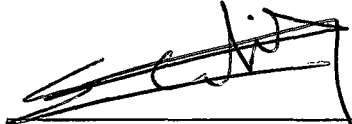
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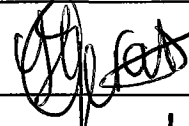
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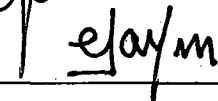
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## **ABSTRACT**

### **COMPARISON OF INFORMATION AND COMMUNICATION TECHNOLOGIES OF IRELAND AND TURKEY**

**Terzi, Filiz**

**M.S, Science And Technology Policies Studies**

**Supervisor: Assoc.Prof. Dr. Haluk Geray**

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This thesis analyses the policies of Information and Communication Technologies (ICTs) of Ireland and Turkey. The thesis will also trace the history of developments of ICTS in both countries and also gives information what Turkey should do to be a leader country in ICTs.

**Keywords: Information and Communication Technologies, Footprint analysis, Ireland.**

**ÖZ**

**İRLANDA VE TÜRKİYE'NİN BİLİŞİM TEKNOLOJİLERİ  
POLİTİKALARININ KARŞILAŞTIRILMASI**

**Terzi, Filiz**

**Yüksek Lisans, Bilim ve Teknoloji Politikaları Çalışmaları**

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Bu çalışma İrlanda ve Türkiye'nin Bilişim Politikalarını bir çerçeve içerisinde incelemiştir. İki ülke karşılaştırması Ayakizi (Footprint) metodolojisi kullanılarak yapılmıştır. Tezde ayrıca bu iki ülkede bilişim teknolojilerinin tarihsel gelişimi araştırılmış, ve Türkiye'nin Bilişim Teknolojilerinde lider ülke konumuna gelmesi için uygulaması gereken politikalara da yer verilmiştir.

**Anahtar Kelimeler: Bilim ve Teknoloji Politikaları, Bilişim Politikaları, Ayakizi Analizi, İrlanda**

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## TABLE OF CONTENTS

ABSTRACT.....	iii
ÖZ.....	iv
ACKNOWLEDGMENTS.....	v
TABLE OF CONTENT.....	vi
CHAPTER	
1 INTRODUCTION.....	1
2 ICTS AND THEIR ROLES IN ECONOMY .....	3
2.1. Digital Age.....	3
2.2. What is ICT, its content, definition .....	3
2.3. ICT Diffusion and Its Contribution to Aggregate Growth .....	5
2.3.1. ICT investment .....	7
2.4. The ICT –producing sector .....	7
2.4.1. Recent developments in the ICT industry .....	7
2.4.2. Structural change of the ICT sector .....	9
2.4.3. Telecommunication.....	12
2.4.4. Software Sector .....	12
3 DEVELOPMENT OF ICT IN TURKEY.....	14
3.1. Situation of Turkey in the World.....	14
3.2. ICT Usage in Turkey .....	16
3.2.1. ICT Sector in Turkey.....	17
3.3. ICT Organization Structure in Turkey .....	24
3.3.1. Policy Makers and Regulatory Bodies .....	24
3.3.2. Information Infrastructure and Knowledge Society Bodies .....	32
3.3.3. Civil ICT Organizations in Turkey.....	42
3.4. Applied Projects in order to increase ICT Usage .....	45
3.4.1. ULAKNET.....	45
3.5. Turkish National Information Infrastructure Masterplan (TUENA) .....	46
3.5.1. Effects of TUENA .....	47
3.5.2. Informatization of the Government.....	48
4 DEVELOPMENT OF ICT IN IRELAND .....	50
4.1. Objectives of Ireland.....	52
4.2. Ireland ICT Usage and Infrastructure.....	55
4.2.1. Telecommunications.....	55
4.2.2. Software Sector .....	63
4.2.3. Electronics Sector.....	65
4.2.4. Internet Usage, e-commerce .....	66
4.2.5. Regional Database of Infrastructure .....	68

4.2.6. e-Government.....	70
4.2.7. ICT Trade .....	70
4.2.8. Resarch and Development .....	72
4.2.9. ICT in Education .....	72
4.3. ICT Organization Structure in Ireland .....	75
4.3.1. Policy Makers and Regulatory Bodies .....	75
4.3.2. Information Infrastructure and Information Society Bodies .....	82
4.3.3. Ask Ireland .....	85
5 COMPARISON OF IRELAND AND TURKEY .....	86
5.1. Mapping ICT Indicators - A Footprint Analysis.....	86
5.1.1. Basic Data .....	88
5.1.2. Physical & Usage Infrastructure Indicators .....	90
5.1.3. ICT Paradigms.....	97
5.1.4. Evaluation of Footprint Analysis.....	105
6 POLICIES THAT TURKEY SHOULD FOLLOW.....	107
6.1. Enabling electronic commerce.....	108
6.2. Information Rich and Information Poor Gap.....	109
7 CONCLUSION .....	110
REFERENCES.....	115

## LIST OF TABLES

### TABLE

1. Demand for National Information Infrastructure Services in Turkey.....	17
2. Distribution of ICT's According to Status .....	17
3. Production (output) millions TRL .....	19
4. Value added (producers' prices) millions TRL .....	20
5. Employment – employees.....	21
6. Wages and salaries, employees .....	22
7. Number of businesses establishments.....	23
8. Members of Internet Committee.....	35
9. Effectiveness Information Infrastructure and Knowledge Society Bodies .....	43
10. Effectiveness of Regulatory Bodies.....	44
11. Annual GDP Growth (%) 1997-2001 .....	51
12. Number and Employment in Overseas IDA Client Companies in Ireland 2001 .....	54
13. Software products: leading exporting countries, 2000 .....	71
14. Population and Households Values for Selected Countries.....	88
15. Physical Infrastructure and Usage Indicators for Footprint Analysis .....	90
16. Data used to find out Physical Infrastructure and Usage Indicators.....	92
17. Values for Physical Infrastructure and Usage Indicators .....	94
18. Index Values for Physical Infrastructure and Usage Indicators.....	95
19. ICT Paradigms Indicators for Footprint Analysis.....	97



20. Values for ICT Paradigms Indicator.....	98
21. Values for ICT Paradigms Indicator.....	99
22. Index Values for ICT Paradigms Indicator.....	100
23. National Strategy Sub-Indicators.....	103
24. Index Values for National Strategy Indicators.....	104



## LIST OF FIGURES

### FIGURE

1. Contribution of ICT-producing and ICT-using sectors to GDP growth in selected OECD countries, 1995-99.....	6
2. Contribution of ICT-producing and ICT-using sectors to labour productivity growth in selected OECD countries, 1995-99 Percentages.....	7
3. Share of ICT investment in total non-residential investment, 2000 Percentages...	8
4. World ICT production by region,1999.....	11
5. GDP Growths .....	14
6. GDP Per Capita.....	15
7. Ageing populations Share of youth and elderly population as % of total population .....	16
8. ULAKNET Nodes.....	47
9. Telephone development 1922-1997 basic indicators. ....	56
10.R&D expenditure in selected ICT industries, 1999 or latest available year.....	72

## **CHAPTER 1**

### **INTRODUCTION**

Information and communications technologies (ICTs) play a strong and increasing role in the world economy. As ICTs increasingly diffuse among firms, industries and countries, those invest in the sector are gaining greater benefits. The use of advanced ICTs has become one of the most significant drivers of world economic growth.

This thesis analyses the policies of Information and Communication Technologies (ICTs) of Ireland and Turkey and is composed of 5 main chapters:

- **ICTs and Their Roles in Economy:**

General information about ICTs and their roles in world economy are discussed.

- **Development of ICT In Turkey:**

ICT Usage, ICT organization structures in Turkey are discussed.

- **Development of ICT In Ireland:**

ICT Usage, ICT organization structures in Ireland are discussed.

- **Comparison of Ireland And Turkey:**

Ireland and Turkey are compared based on ICTs data. Footprint analysis is used for comparison.

- **Policies That Turkey Should Follow:**

In order to become a leading country in ICTs, which policies Turkey should implement are discussed in this part.

Ireland is a relatively small country, but Ireland's economic growth rates over recent years have been consistently among the highest of many countries. Ireland's aim is to be the ICT center of the Europe and Ireland is number one in the software export in Europe. This is the result of consistent policies that were implemented since 1970s after the importance of ICTs were acknowledged.



## **CHAPTER 2**

### **ICTS AND THEIR ROLES IN ECONOMY**

#### **2.1. Digital Age**

As Peter Drucker who is a famous historian and visionary says

Developing countries can no longer expect to base their development on their comparative labour advantage-that is, on cheap industrial labour. The comparative advantage that now counts is the application of knowledge (Mansell, 1998).

#### **2.2. What is ICT, its content, definition**

Key features of effective national ICT strategies are the capabilities to assess strengths and to target areas for more effectively producing or using ICTs that are responsive to development goals. This is especially important for the least developed countries (Mansell and Whn 1998).

The uneven diffusion of ICTs between the industrialised and developing countries as well as disparities within countries leads to concerns about the way to reduce gaps in the accessibility and affordability of these new technologies.

Some newly industrialised countries have been making huge investments in the telecommunication infrastructure. For these countries, penetration rates of telephone services and advanced ICT-based services and applications have been reaching the levels of the industrialised countries. However, in many developing countries, and especially the least developed countries, the most

basic telecommunication infrastructure is still absent, unreliable, and/or very costly (Mansell and Whn 1998).

As Mansell and Wehn emphasize,

ICTs have a very important role to play in building the social capability to generate information and to apply knowledge for sustainable development. Social capability is the levels of general education and technical competence; the commercial, industrial and financial institutions that bear on their abilities to finance and operate modern large scale business; and the political and social characteristics that influence the risks, the incentives and the personnel rewards of economic activity, including those rewards in social esteem that go beyond money and wealth. Social capabilities complement technological capabilities and they combine in many different ways to generate economic growth (1998 page 10).

The emergence of new capabilities is closely linked to the progress of scientific and technical innovation. Those with access to these innovations-and those who have the capacity to absorb them and use them will have opportunities to reap social and economic advantages. Those without access and the appropriate capabilities risk being marginalized in the "knowledge societies' of the future" (Mansell and Wehn 1998).

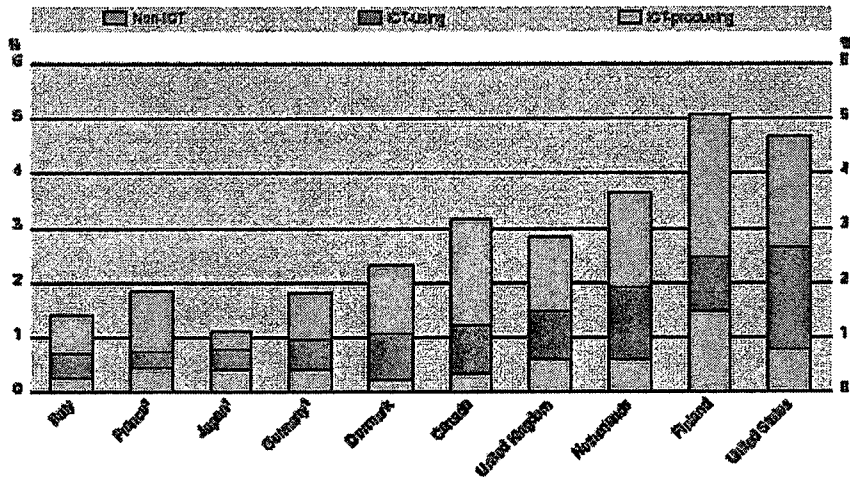
Rapid technological advances in digitalisation, packet switching and semi-conductors have spawned vast industries, applications and opportunities for new entrepreneurs and established multinationals alike. Policies and practices which foster market driven infrastructure and services are creating new choices for people to live, work, learn and create. Most dramatic has been the advance of the Internet (Mansell and Wehn 1998).

As the fastest growing network in the history of communications, the Internet marks the beginning of the great discontinuity of technological convergence between telephone, television and computer. Reversing the traditional relationship between quality, functionality and price, the Internet is overtaking current telecommunications orthodoxy, creating a critical need not only for higher

transmission speeds and better connectivity but also for the development of entirely new models of pricing, regulation and ownership. In combination with the wireless revolution, the Internet heralds a dislocation in the structure of the telecommunications industry more profound than the shift from mainframe to personal computers.

### **2.3. ICT Diffusion and Its Contribution to Aggregate Growth**

There has been continuing debate regarding the relative importance of diffusion and use versus production of ICTs in improved economic performance. Increasing firm-level evidence suggests that effective diffusion and use of these technologies are key factors in broad-based growth, particularly when combined with effective human resource strategies involving education and training and organisational change. There is also increasing evidence that the effective use of ICT is contributing positively to growth at the sectoral level. Recent studies have attempted to quantify the contribution of ICT-producing and ICT-using sectors to aggregate GDP and productivity growth during the 1990s. Figure 1 shows the contributions of ICT-producing, ICT-using and other sectors to GDP growth between 1995 and 1999 in the G7 countries as well as Denmark, Finland and the Netherlands. The data confirm that the contribution from ICT sectors was highest in the United States (mainly owing to ICT-using sectors) and Finland (mainly owing to ICT-producing sectors). Even in Japan and Italy, which experienced relatively slow GDP growth, the contribution of ICT-producing and ICT-using sectors was still significant, exceeding 50%. When compared with the period 1990-95, the contributions from both the ICT-producing and ICT-using sectors to the acceleration of GDP growth during the second half of the decade were



**Figure 1** Contribution of ICT-producing and ICT-using sectors to GDP growth in selected OECD countries, 1995-99

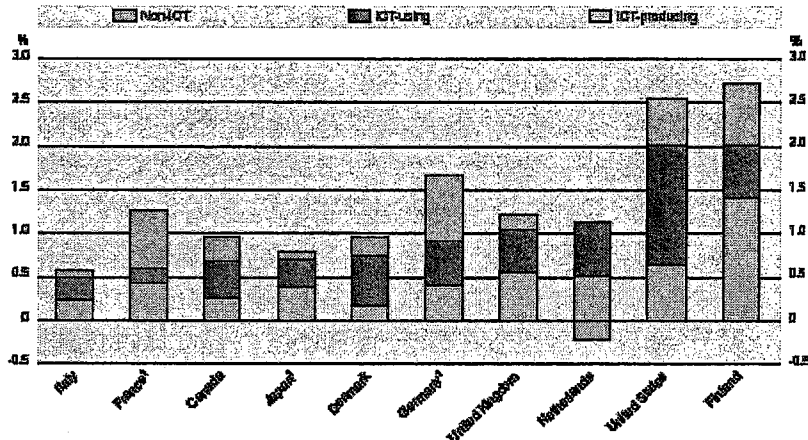
Source: OECD Information Technology Outlook ICTs and the Information Economy, Figure 3

particularly high in Finland, followed by the Netherlands and the United States. If ICTs are indeed contributing to the shift in our economies towards higher sustainable growth paths, one would expect them to be playing an important role in the recent acceleration of productivity growth. During the period 1995-99, for all ten countries examined, labour productivity growth in the ICT-producing sector was substantially higher than in the rest of the economy. Overall, as Figure 2 shows, ICT-producing and ICT-using industries contributed in an important way to the growth of total labour productivity across the economy during the second half of the 1990s, particularly in Finland and the United States.

These results support the view that countries can reap benefits (in terms of economic growth) from different ICT-related strategies: fostering a strong ICT-producing sector (*e.g.* Finland) or successfully harnessing the benefits of ICT usage in other sectors of the economy (*e.g.* United States, Denmark)

(OECD Information Technology Outlook).





**Figure 2** Contribution of ICT-producing and ICT-using sectors to labour productivity growth in selected OECD countries, 1995-99 Percentages  
 Source: OECD Information Technology Outlook ICTs and the Information Economy, Figure 4

### 2.3.1. ICT investment

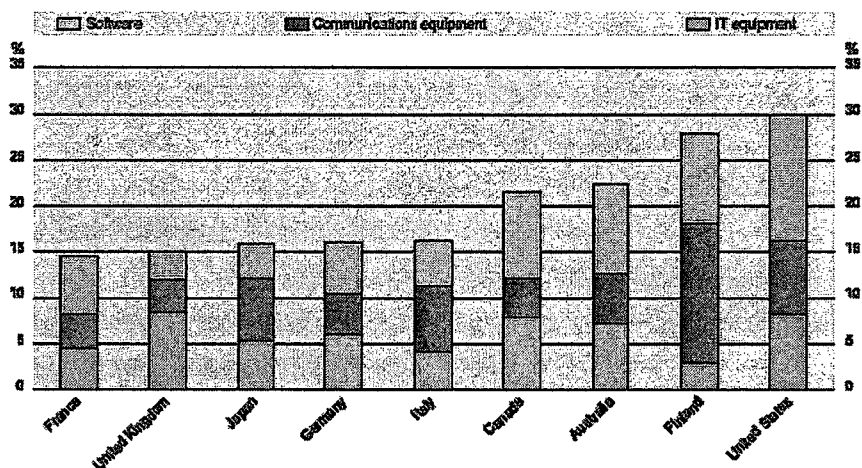
ICTs have an increasing share in all investment across the economy, owing to rapid price declines and growing demand for ICT applications. In a group of nine OECD countries (the G7 countries plus Australia and Finland), ICT investment rose from less than 15% of total non-residential investment in the business sector in the early 1980s to between 15% and 30% in 2000 (Figure 4) (OECD Information Technology Outlook).

## 2.4. The ICT –producing sector

ICT sector contributes directly to growth, but also provides goods and services that improve the functioning of other economic sectors.

### 2.4.1. Recent developments in the ICT industry

Several factors have contributed to modify the short-term economic landscape for the ICT industry. The economic slowdown, which began in the United States, has since spread to Europe and other parts of the world. Several factors have contributed to the current slump in the industry:



**Figure 3** Share of ICT investment in total non-residential investment, 2000  
 Source: OECD Information Technology Outlook ICTs and the Information Economy, Figure 1

- Over-investment by firms, including in excess telecommunications capacity.
- The correction in high-technology stock markets, the collapse of equity values and the ensuing reverse “wealth effect” for consumers. This has created a difficult climate for new firms seeking financing and uncertainties for those seeking to launch initial public offerings.
- Saturation in certain markets, such as consumer PCs in the United States and mobile phones in some European countries.
- On the supply side, more efficient production methods have resulted in lower inventory buffers, while on the demand side, firms accelerated write-offs to maintain profits. As the economy started to slow, vendors were forced to slash margins to maintain sales (price wars), while purchasing firms deferred investments and cancelled orders.

Given the overall economic uncertainty, it is difficult to predict when a full recovery in ICT demand will occur. Also as of late 2001 and early 2002, business demand for ICTs in the United States has remained high by historical standards. Overall, the sharp declines in nominal terms on the supply side only took output

back to historically high levels of a few years earlier. Most analysts had forecast some uncertainty during the first half of 2002, which should gradually dissipate as business confidence improves, the effects of monetary loosening are felt. Other positive factors will contribute to the recovery within the sector: ICTs enable firms to operate more efficiently and control costs, and this becomes a vital competitive advantage during a period of economic turmoil.

#### **2.4.2. Structural change of the ICT sector**

Despite the cyclical downturn, longer-term prospects for the industry remain solid since, based on past experience, new products and services will drive demand from businesses, households and governments. In this section especially OECD members will be analysed and OECD data will be used to show the World ICT Profile. The reason is that overall data is gathered from OECD sources.

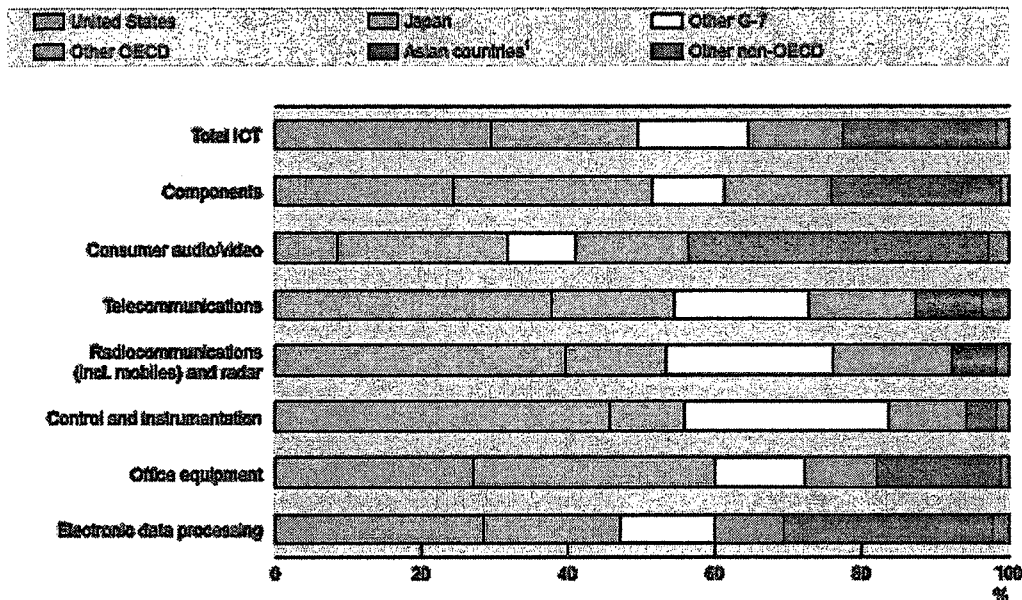
##### **2.4.2.1. Production**

Between 1995 and 1999, the production of ICT goods in the OECD area increased slightly in value at a compound growth rate (CAGR) of 1.4% in nominal terms, mainly owing to radio communication, mobile and telecommunication equipment [data from Reed Electronics Research (2001); ICT goods comprise EDP equipment, office equipment, control and instrumentation, radio communications, including mobiles, and radar, telecommunications, consumer and components: growth in real terms would show faster gains owing to price declines in these market segments]. Countries experiencing strong growth included Denmark, Finland and Sweden, and, to a lesser extent, the United Kingdom, Korea and Ireland. Ireland is also the only OECD country to have enjoyed very strong growth in production during the last half of the decade, owing mainly to EDP (electronic data processing equipment) and components (CAGR

of 6.1% and 7.5% respectively). On the other hand, at the OECD level as well as in individual countries, consumer electronics and office equipment have been declining slightly.

Mirroring the situation in the OECD countries, production in the Asian countries grew at more than six times the pace in OECD countries (CAGR of 8.7%) and was mainly concentrated in EDP, consumer electronics and components. The Philippines, China, Malaysia and Chinese Taipei grew most rapidly mainly owing to components and EDP, as well as consumer electronics for China. China alone accounted for around one-fifth of the production of consumer electronics in 1999, against less than 10% in 1995.<sup>2</sup> As a result, the Asian countries had around 21% of global ICT goods production in 1999, against only 15.6% in 1995 and 10.4% in 1990.

The United States remains the world's largest ICT producer (29.5%), with a specialisation in EDP and radio- and telecommunication. Japan remains the second largest ICT producer (20%) and the first for consumer electronics and components. However, its relative share in global ICT strongly declined during the 1990s, especially sharply in the second half of the decade, mainly to the benefit of other Asian countries, especially China and Chinese Taipei for EDP. The situation in Europe has been more contrasted, with some of the Nordic countries specialising in communication equipment and Ireland in EDP and components. During the 1990s, ICT production increased relatively more in components, EDP and radio and mobile communication, mainly to the detriment of consumer electronics, and to a lesser extent, office equipment (Figure 4) (OECD Information Technology Outlook page 29).



**Figure 4** World ICT production by region, 1999

Source: OECD Information Technology Outlook ICTs and the Information Economy, Figure 9

#### 2.4.2.2. Value added

In the second half of the 1990s, the share of the ICT sector in value added increased in OECD countries, mainly owing to the strong growth of ICT services.

There are exceptions, such as Finland, where the ICT manufacturing sector more than doubled, owing to the importance of the telecommunication equipment manufacturer, Nokia.

On average, the ICT sector contributed around 9.5% of business sector GDP in 1999, against only 8% in 1995. The share varies from 4% to more than 16% (Figure 10a). Austria and Greece are the only countries for which the share of the ICT sector (in terms of value added) did not increase during the period 1995-99.

In both cases, the ICT manufacturing sector saw its relative share remain stable, while the share of the ICT services sector decreased slightly (OECD Information Technology Outlook).



### **2.4.3. Telecommunication**

In 2001, out of USD 10 spent in the OECD-area ICT market, almost USD 4 went to telecommunications (including equipment and services). Market liberalisation was the main underlying factor in this market's development during the 1990s. New technologies and new services, and the advent of a commercial Internet, also contributed to an increase in the demand for most types of telecommunication goods and services.

Extremely rapid growth between 1992 and 2001 in Hungary, the Czech Republic, the Slovak Republic and Poland reflects the joint effects of economic development and basic infrastructure investment as well as anticipated or on-going liberalisation. For similar reasons, Portugal, Greece and Turkey also experienced strong growth in their telecommunications market during the period. In most of the countries, telecommunication markets have been the main driving force behind the growth in ICT markets in nominal terms; they contributed on average around two-thirds of growth during the period 1992-2001 (OECD Information Technology Outlook).

### **2.4.4. Software Sector**

The software industry is at the heart of information technologies and is closely linked to the computer and communications industries both technologically and through the activities of firms. It has been of growing policy interest since its emergence as an independent economic activity. It is increasingly important for driving the information economy and a key component of investment. The impacts of software are pervasive owing to the constant innovations that underpin the increasing spread of information and communication technologies (ICTs) and the Internet throughout the economy and society. In the knowledge-based

economy, “the creation of wealth becomes synonymous with creating products and services with large software content” (Hagel and Armstrong, 1997).

The evolution of the software sector rests on the complementarities between software and hardware. Software programs require the support of hardware, and hardware usually relies on software to be functional. Software production entails high sunk costs for development and testing (“first copy” costs) prior to launching the product. However, once products are developed, replication costs are minimal, thereby generating large economies of scale. In addition, owing to network effects on the demand side, the value of a software programme increases with the rise in the number of users running it. Thus, users can exchange information with other users running compatible programmes and software developers and hardware manufacturers have incentives to develop products for common platforms (OECD IT Outlook 2002).

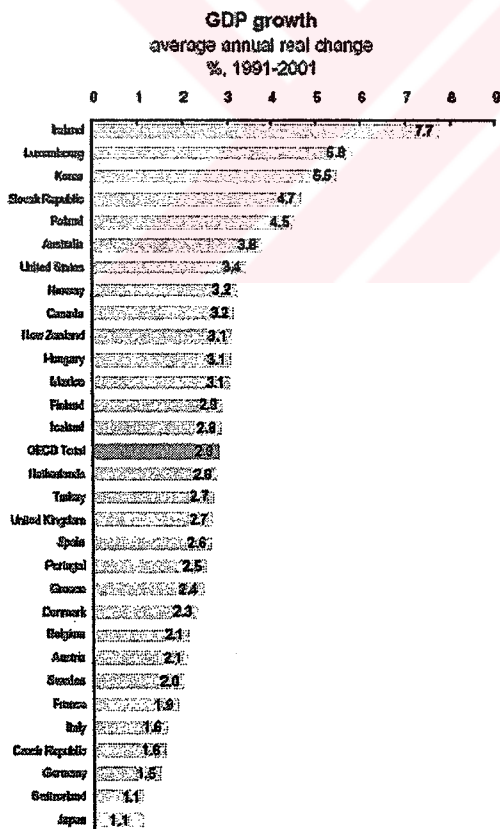
The combination of economies of scale on the supply side and network effects on the demand side can lead to the establishment of *de facto* standards. In dynamic software markets, technological innovation constantly challenges leaders, and network effects may accelerate the advent of new standards and the displacement of old ones, in a process frequently referred to as “creative destruction” (Schumpeter, 1950).

## CHAPTER 3

### DEVELOPMENT OF ICT IN TURKEY

#### 3.1. Situation of Turkey in the World

Turkey's GDP growth with comparison to other OECD countries is in Figure 6. GDP Growth of Turkey is better than many countries such as France, Italy and Germany.



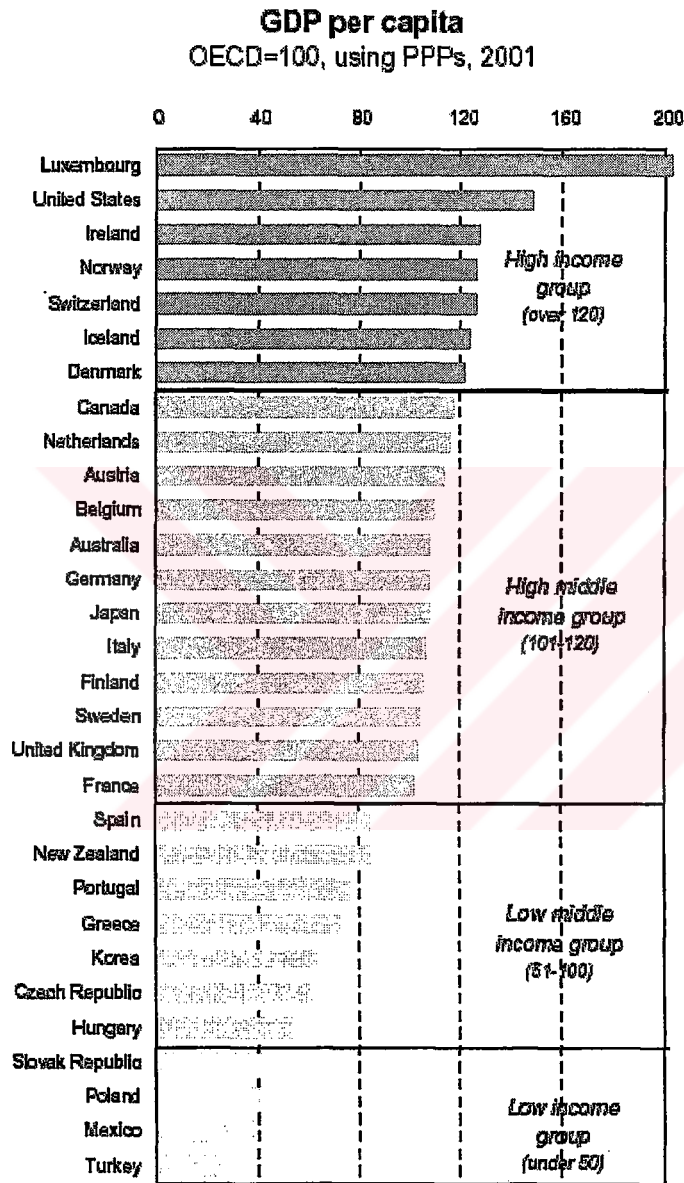
**Figure 5 GDP Growths**

Source: OECD in Figures, Statistics on Member Countries, 78



Turkey's GDP per capita with comparison to other OECD countries is in Figure 7.

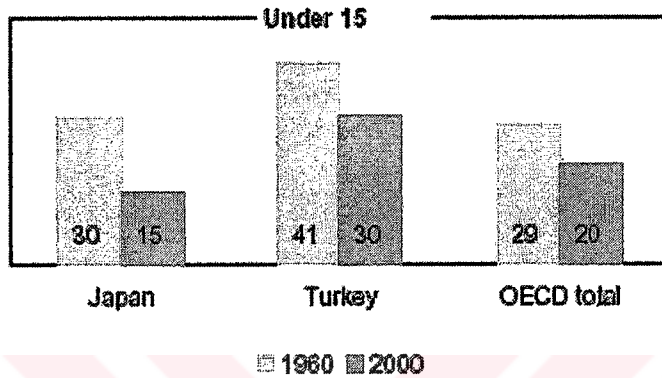
Turkey is in the last of the list.



**Figure 6 GDP Per Capita**

Source: OECD in Figures, Statistics on Member Countries, 79

Turkey has a 68 million population (census of 2000) and yearly population increase rate is 18,28. Turkey has one of the OECD's highest youth populations with 30% of the total under 15 (Figure 8),



**Figure 7** Ageing populations Share of youth and elderly population as % of total population

Source: OECD in Figures, Statistics on Member Countries, 86

### 3.2. ICT Usage in Turkey

The role of ICT in economic growth and social change has received considerable attention in recent years on the economy. ICTs have strategic importance to determine the statue of countries. As ICTs are generic technologies, ICTs affect the economy by science, technology, engineering and management. ICT usage is an important indicator to determine the future of a country and Turkey is not an effective ICT user. According to the results of Turkish Information Infrastructure Master Plan (TUENA) Survey, household population of Turkey wants to use the National Information Infrastructure extensively. According to the survey, the most prospective interactive services are listed in Table 1.

Turkey shows an uneven distribution of communication technologies and services among its population. Large differences exist within social groups, whereas nearly 77% of all computers are owned by 40% of all households belonging to the highest socio-economic status groups. The low economic status

group with around 40% of the households owns only 10% of all computers (Table 2).

**Table 1 Demand for National Information Infrastructure Services in Turkey**

<b>SERVICES</b>	<b>Demand (%)</b>
Finding out and paying telephone, tax, water, etc. bills due and payable	86.2
Submitting petitions and receiving answers	75.5
Booking and receiving tickets	73.5
Exchanging information	73.2
Cinema, music and other cultural events	73.2
Receiving a lycée/university diploma or a course certificate	66.8
Access to libraries, museums and art galleries	64.9
Viewing and buying goods	62
Making bank and stock exchange transactions	58.5
Lodging job applications	57.2

Source: TUENA Final Report, Table 4

**Table 2 Distribution of ICT's According to Status**

<b>Technology</b>	<b>Lowest 20%</b>	<b>Lower 20%</b>	<b>Middle 20%</b>	<b>Higher 20%</b>	<b>Highest 20%</b>
Computer	2.9	7.4	12.4	24.8	52.5
Telephone	13.7	19.5	21.0	22.4	23.4

Source: TUENA Final Report, 1999 Table 2

### **3.2.1. ICT Sector in Turkey**

Capabilities of local ICT industries are important for the global and national share that Turkey will take in the establishment of the National Information Infrastructure.

Although there is a high competition in ICT related sectors in the world, Turkey seems not involved in this sector as producer. The main reason of this is defined as “culture of entrepreneurship” in “Information and Communication Technologies, Enlargement Future Series” as:

While the Internet service provider market is quite dynamic, there are so far very few examples in Turkey of Internet-related activities that are involved in the creation of distinctly new products or services reflecting strong innovative activity. One possible explanation for this is what appears to be a rather low culture of entrepreneurship. In Turkey the start-up life cycle typically gets shortcircuited. First, there are very few success stories along these lines in Turkey, so a young person sees little in his or her experience to inspire him/her to start a new company. Second, some have indicated that as a whole Turks do not have a risk-taking mentality in which failure is an acceptable outcome. Third, there is little venture capital to fund start-ups. Given the inflation rate and the enormous debt the Turkish government carries, the interest rates on government securities are quite high. Money in Turkey is more likely to be attracted to well-paying, safe investments than to highly speculative ventures. Fourth, it is virtually impossible to survive as a software company in Turkey. Software piracy is rampant (Information and Communication Technologies, Enlargement future Series, Box 15).

ICT Sector in Turkey can be defined with the numbers in the following Tables 3, 4, 5, 6, and 7.

**Table 3** Production (output) millions TRL

	1995	1996	1997	1998	1999	2000
ICT manufacturing	122,520,416	204,440,596	380,302,531	752,400,251	1,289,565,976	..
<i>of which office, accounting and computing machinery</i>	2,814,716	2,639,412	17,131,645	27,663,161	69,138,631	..
Telecommunications	83,609,778	207,765,180	478,974,244	..	..	..
Computer and related activities	3,186,956	8,117,932	26,989,899	43,113,500	89,081,255	..
<i>of which software consultancy and supply</i>	1,300,081	4,688,105	16,670,620	30,397,025	69,110,996	..
Other ICT services	..	..	..	..	..	..
Total ICT sector	..	..	..	..	..	..

Source: Measuring The Information Economy 2002 - ICT sector in Turkey: Core Tables

**Table 4** Value added (producers' prices) millions TRL

	1995	1996	1997	1998	1999	2000
ICT manufacturing	56,152,679	92,536,393	139,751,088	275,763,232	525,978,409	..
<i>of which office, accounting and computing machinery</i>	610,734	671,911	3,371,661	12,158,061	12,230,552	..
Telecommunications	..	..	..	..	..	..
Computer and related activities	1,596,116	3,335,469	11,072,984	19,385,758	52,025,649	..
<i>of which software consultancy and supply</i>	601,732	1,495,210	6,004,215	11,872,386	37,631,695	..
Other ICT services	..	..	..	..	..	..
Total ICT sector	..	..	..	..	..	..

Source: Measuring The Information Economy 2002 - ICT sector in Turkey: Core Tables

**Table 5** Employment – employees

	1995	1996	1997	1998	1999	2000
ICT manufacturing	20,938	21,887	21,122	25,253	26,495	..
<i>of which office, accounting and computing machinery</i>	328	310	531	903	1,048	..
Telecommunications	..	..	..	..	..	..
Computer and related activities	1,224	2,028	2,807	3,211	3,328	..
<i>of which software consultancy and supply</i>	386	1,149	1,878	2,086	2,266	..
Other ICT services	..	..	..	..	..	..
Total ICT sector	..	..	..	..	..	..

Source: Measuring The Information Economy 2002 - ICT sector in Turkey: Core Tables

**Table 6** Wages and salaries, employees

	1995	1996	1997	1998	1999	2000
ICT manufacturing	9,810,377	19,030,868	29,731,215	70,667,701	126,707,482	..
<i>of which office, accounting and computing machinery</i>	61,156	67,426	611,389	2,515,068	2,841,067	..
Telecommunications	19,268,356	49,797,948	113,137,482	..	..	..
Computer and related activities	668,788	1,392,568	2,846,581	5,121,784	14,893,392	..
<i>of which software consultancy and supply</i>	241,457	589,319	1,656,770	2,799,566	5,662,395	..
Other ICT services	..	..	..	..	..	..
Total ICT sector	..	..	..	..	..	..

Source: Measuring The Information Economy 2002 - ICT sector in Turkey: Core Tables



**Table 7** Number of businesses establishments

	1995	1996	1997	1998	1999	2000
ICT manufacturing	153	156	150	174	165	..
<i>of which office, accounting and computing machinery</i>	7	6	10	10	10	..
Telecommunications	1	1	1	..	..	..
Computer and related activities	212	237	243	270	245	..
<i>of which software consultancy and supply</i>	46	61	62	66	72	..
Other ICT services	..	..	..	..	..	..
Total ICT sector	..	..	..	..	..	..

Source: Measuring The Information Economy 2002 - ICT sector in Turkey: Core Tables

### **3.3. ICT Organization Structure in Turkey**

#### **3.3.1. Policy Makers and Regulatory Bodies**

##### **3.3.1.1. Science and Technology High Board**

Science and Technology High Board was established under the Prime Ministry in order to define, guide and coordinate science and technology research and development policies with respect to economic progress, social development and national security aims. Science and Technology High Board is a superior board consisting of the Ministers of State, National Defence, Finance, National Education, Health, Forestry, Agriculture and Rural Affairs, Industry and Trade, Energy and Natural Resources, President of Council of Higher Education, Undersecretaries of the State Planning Organisation, Treasury and Foreign Trade, President of TUBITAK and his/her assistant, President of Turkish Atomic Energy Authority, General Manager of Turkish Radio-Television Corporation, President of Turkish Union of Associations and Stock Exchanges, and a university representative (Bilim ve Teknoloji Yüksek Kurulu Kurulmasına İlişkin Kanun Hükmünde Kararname).

##### **3.3.1.2. The Ministry Of Transport, General Directorate of Telecommunications**

###### **3.3.1.2.1. Functions**

- To define principles for the establishment and development and application of postal and telecommunication services with respect to technical, economical and social requirements, public benefits and national security aims and follow and control the applications.

- To define, plan and coordinate telecommunication demands and requirements.
- To arrange, control and coordinate telecommunication activities in public organizations, municipalities, national and international organizations.
- To attend the studies made by international telecommunication organizations, that Turkey is a member of, follow the decisions to be applied.
- To study and evaluate national and international postal service fees (<http://www.ubak.gov.tr/tr/hgm/index.htm>).

### **3.3.1.3. The Communications High Board**

The Communications High Board is a superior board consisting of the Minister of Internal Affairs, the Minister of Transport, the Secretary General of National Security Council, the Undersecretary of the National Intelligence Organization and the President of the General Staff Electronic Communication gathered under the presidency of the Prime Minister or a State Minister authorized by the Prime Minister.

Responsibilities of the Communications High Board are to make suggestions to the Ministry of Transport regarding wireless communication and to follow up the activities in this respect. The Communications General Directorate shall meet secretarial needs of the Communication High Board (Law Amending Certain Articles of the Telegram and Telephone Law, Law on Organisation and Responsibilities of the Ministry of Transport and Wireless Law, Law on Savings and Aid Fund of the Posts Telegraphs and Telephone Administration and Organisational Charts attached to the Decree with the Force of Law on the General Cadrees and Procedures).

#### **3.3.1.4. Telecommunications Authority**

Telecommunication Authority was founded in 27 January 2000 by 4502 numbered Law.

The Authority is empowered to take the necessary measures to ensure compliance with the terms of the concession agreement it has executed with and telecommunication licenses it has issued to operators including Turkish Telecommunications Co. Inc., to supervise and inspect the carrying out of the activities in accordance with the applicable legislation and the concession agreement, telecommunication license, general authorization, and if there exists a breach, to impose, an administrative fine up to 3 % of the turnover of the operator concerned for the previous calendar year. The Ministry is authorised to take the necessary measures for purposes of national security, public order, or orderly provision of public services, and where necessary, to take over the facilities against compensation, or in the event of a gross default, to cancel the concession agreement, the telecommunication license or the general authorization (<http://www.tk.gov.tr>).

##### **3.3.1.4.1. Functions**

- to prepare and submit to the Ministry of Transport the necessary plans in the field of wireless communication and telecommunications within the framework of the general principles set out in 4502 numbered Law and Telegram and Telephone Law dated 5.4.1983 and numbered 406, and to supervise the activities of the other relevant public entities and establishments and individuals and private law legal entities in these fields,

- to perform the duties set out in this Law, to keep all kinds records and to take the necessary technical and administrative measures against the persons violating the current provisions,
- to present its views to the Ministry of Transport in connection with the concession agreements which have or are to be executed and telecommunication licenses to be issued by the Ministry of Transport in respect of telecommunication services and/or infrastructure to be operated by capital companies incorporated in Turkey, to make proposals to the Ministry for preparation of general authorizations, to monitor compliance with the terms and conditions of such concession agreements and telecommunication licenses, and to monitor compliance with general authorizations and to take the necessary measures to this effect,
- to determine the general criteria and implementation procedures and principles relating to tariffs ,contractual conditions and technical matters applicable to users of telecommunications services and infrastructure and for interconnection between the telecommunication networks of other operators, and relating to other matters falling under its mandate, and to review and evaluate, and approve where necessary, tariffs and monitor their implementation,
- to provide that the provision of telecommunication services and operation of telecommunication infrastructure by the operators and other individuals who are trading in such field pursuant to this Law and that the services and activities of the producers and traders of telecommunication apparatus and equipment are realized in Turkey in a completely competitive environment and to take the necessary promoting measures,

- to determine and implement the performance standards applicable for the manufacture and utilisation of all kinds of systems and equipment to be used in the field of wireless communications and telecommunications in cooperation with the relevant entities in and outside Turkey and taking into account the latest developments,
- to issue regulations and enact other administrative acts relating to wireless communication and telecommunications, operation of infrastructure and matters which fall under its field of responsibility, and to monitor the compliance of operators, subscribers, users, and all individuals and legal entities who have impacts on the Turkish telecommunication sector with the relevant legislation, and to impose sanctions contemplated by laws when necessary,
- to determine the procedures and principles regarding the establishment of common antenna systems and facilities for ensuring the provision of all kinds of broadcast, including radio and television broadcast, from certain specified emission points,
- to determine, amend, collect or cancel the tariffs within the limits of re-evaluation rate determined by the Ministry of Finance and to set out procedures and principles applicable to same, to approve the annual budget, final income and expenditure account, annual work program of the Authority, to make transfers between the account headings within the budget if necessary or to decide on the transfer of excessive income to the general budget if requested.

The Authority is empowered to investigate either at its own initiative (*ex officio*) or upon complaints relating to the provision of telecommunication services and operation of infrastructure and anti-competitive behaviours, plans and applications in both such services and in the telecommunications sector

generally and to require provision of information and documents in relation to the matters coming under its mandate. Before issuing regulations and taking any other general administrative action in relation to telecommunication services and infrastructure, the Authority shall take such steps as may be necessary to allow interested parties to submit representations which shall be publicly disclosed and on which interested parties may comment. The Authority shall also take the necessary measures to protect the interests of consumers.

### **3.3.1.5. Radio and Television Supreme Council- RTÜK**

The Radio and Television Supreme Council is established to regulate radio and television broadcasting services.

Supreme Council is composed of nine members of which ;

- Five members to be elected by Turkish Grand National Assembly upon nomination of political party groups determined according to the Turkish Grand National Assembly Presidency Council formulation quota,
  - Two members to be elected by Council of Ministers among 4 nominees of Higher Education General Board from non-members of the Board in electric-electronics, communication, culture/arts and print/audiovisual media fields,
  - One member to be elected by Council of Ministers from 2 candidates jointly to be nominated by two journalists association having the most numerous members with yellow press card and Press Council,
  - One member to be elected by Council of Ministers from 2 candidates to be nominated by National Security Council General Secretariat among civil servants,
- ([www.rtuk.org.tr](http://www.rtuk.org.tr))

### **3.3.1.5.1. Functions**

- Commensurate with standards of impartiality and fairness, broadcasting permits and licenses to applicants who have complied with the prerequisites; to allocate 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, excluding those channels and frequency bands used by the Turkish Radio and Television Corporation,
- To issue 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 to supervise the compliance of the facilities with the provisions of the Radiocommunication Law and with the prerequisites for such facilities,
- To issue 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 radiolink 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 Radiocommunication Law No. 2813 of 5.4.1983,
- to encourage enterprises to extend their broadcasts to various regions of the country, while observing regional balances in the allocation of time sharing channels,



- To specify and publicize, while bearing in mind the principles of the European Convention on Transfrontier Television , the prerequisites and standards to be fulfilled by public and private radio and television enterprises that intend to transmit from within the country in order to apply for broadcasting permits and licenses,
- To establish via relevant regulations the preconditions for allocating channels and frequency bands, the deadlines for recipients of allocations to start regular broadcasts, and the broadcasting permit and license fees to be paid by operators of radio and television stations,
- To decide on the relevant sanctions in cases of violation of the provisions of this Law or of the conditions for frequency allocation,
- To permit building of radio and television transmitters by local means in parts of national territory that cannot be reached by available transmissions.
- To ensure that broadcasts from or to national territory to be transmitted via satellite conform to national and international rules and standards, and to cooperate to this end with competent authorities in other states,
- To formulate the rules to be applied to encoded broadcasts and to cable radio and television installations and broadcasts within the framework of this Law, taking care not to leave any surplus capacity in the cable radio and television facilities of the PTT Administration,
- To conduct or commission public opinion surveys in order to follow regularly the reaction, approval or sensibilities of the public and to provide appropriate guidance in relation to radio and television broadcasts, on condition that the functions and powers of the Ministry of Foreign Affairs are preserved,

- On condition that the functions of the Directorate General of Radiocommunication and the functions and powers of the Ministry of Foreign Affairs are preserved, to represent the State at organizations that have legal personality under international law, and are concerned with radio and television broadcasts, as well as fulfilling the representation function at international organizations concerned with radio and television broadcasts but without legal personality under international law; to sign duly the instruments formulated under this paragraph,
- To evaluate trends in public opinion by periodically consulting with institutions and agencies on radio and television broadcasts,
- To draft the regulations and other rules regarding its own work and activities in keeping with this law and the European Convention on Transfrontier Television (<http://www.rtuk.org.tr>).

In 21 May 2002, functions of RTÜK were extended and network such as Internet broadcast was involved in the functions of RTÜK. So televisions and radios, which are broadcasting on Internet, are in the control of RTÜK and also textual broadcasting can be in the control of RTÜK (Geray, 2003).

### **3.3.2. Information Infrastructure and Knowledge Society Bodies**

#### **3.3.2.1. Undersecretariat of Foreign Trade**

##### **3.3.2.1.1. Electronic Commerce Coordination Board**

Parallel to the developments experienced in the world, aiming at formulating a national strategy and providing widespread use of e-commerce in Turkey, it was decided on a meeting held on August 1997 by Science and Technology High Board chaired by Prime Minister that a working group should be established and

the task of coordination in the studies to be made was assigned to the Undersecretariat of Foreign Trade and the task of secretariat was assigned to TÜBİTAK-BİLTEN (The Scientific and Technical Research Council Of Turkey-The Institute of Information Technologies). In accordance with this decision, the first meeting of Electronic Commerce Coordination Board (ECCB) established by the participation of the related institutions and chaired by Undersecretariat of Foreign Trade was held on 16 February 1998. Thus, regular and broad participated studies have been commenced in order to improve e-commerce (<http://www.e-ticaret.gov.tr>).

#### **3.3.2.2. Internet Committee**

Internet Committee was established by Ministry of Transport. The objectives of the committee are:

- To make consultancy for Ministry of Defence,
- To define short, middle and long term targets of Internet with considering all the dimension such as infrastructure, be a consultant in the process of getting required strategic and national decisions to reach these targets,
- To examine the problems facing in the application phase and make suggestions in order to handle these problems
- To Enable coordination between the related organizations
- To make suggestions about development, service production and to protect national benefits.

##### **3.3.2.2.1. Functions of Internet Committee**

Committee has the following functions:

- **Planning:** To make suggestions about short, middle and long term plans about national Internet infrastructure. To make suggestions about what to do about services on Internet and sectoral structure in short, middle and long periods. To make suggestions about Internet infrastructure and services that will be applied by the related organizations.
- **Coordination:** To contribute all related organizations (university, public, private and civil community) to do Internet activities coordinated so Turkish national Internet will develop healthy.
- **Following:** To gather data from related organization and publish them in order to evaluate Internet development in Turkey. To gather and evaluate opinions and suggestions of Internet users in Turkey. To make scientific measurement on Turkish Internet and publish the results.
- **Suggestions about applications:** To make suggestions to the organizations that are in Internet area and service sector as required for the healthy development of Internet in Turkey. Also to make suggestions to the Inter Technologies producers and sellers
- To make mechanism to evaluate public opinions.
- Follow the developments in the world.
- To protect national benefits in international areas.
- To attend international meetings and conferences for information exchange and protection of national benefits and make suggestions by representing Turkey's opinions.
- Organize educational activities.

- To organize conferences, seminars, etc. to contribute to the information and experience about Internet technologies, to support educational efforts for the rationalist usage of technologies (<http://www.ubak.gov.tr/kurul/index.htm>).

### 3.3.2.2.2. Organization Structure

The president of the committee is the Minister of Transport. Internet Committee has the members from the organizations in Table 8.

**Table 8** Members of Internet Committee

<b>Public Institutions and Organizations</b>	<b>Number of Member</b>
Ministry of Justice	1
Secretariat of the State Planning Organisation	1
Undersecretariat of Foreign Trade	1
Ministry of Foreign Affairs	1
Board of Electronic Commerce Coordination (ETKK)	1
General Staff	1
Treasury	1
Ministry of Interior	1
Küçük ve Orta Sanayi Geliştirme Başkanlığı (KOSGEB)	1
Ministry of Culture	1
Ministry of Finance	1
Competition Authority	1
Telecommunications Authority	1
Ministry of Tourism	1
TÜBİTAK	1
Ministry of Transportation General Directorate of Telecommunication	1
Universities	3
<b>Infrastructure /Technology Service /Content Providers</b>	<b>Number of Member</b>
Content Providers	3

Internet Service Providers	4
Technology Producer Firms (Computers)	1
Technology Producer Firms (Network)	1
Telecommunication Operators	4
Turkish Telecommunications Co. Inc. (TT-Net Representative)	1
Turkish (.tr) DNS Service (METU)	1
Banks Association Of Turkey	1
<b>Civil Community Organizations</b>	<b>Number of Member</b>
Press Representative	1
Users	1
Internet Houses Representative	1
Internet Foundation	1
Union Representative	1
Association Of Consumer Protection Representative	1
Telecommunication Businessmen's Association – TÜTED	1
Librarian Association Of Turkey – TKD	1
Union of Chambers of Turkish Engineers and Architects– TMMOB	1
Association Of Turkish Doctors – TTB	1
The Union of Turkish Bars – TBB	1
Municipality Association Of Turkey	1
Informatics Association Of Turkey – TBD	1
Informatics Industry Association Of Turkey – TÜBİSAD	1
Turkish Informatics Foundation – TBV	1
Turkish Electronics and Information Industries Association – TESİD	1

Türkiye Odalar ve Borsalar Birliği – TOBB	1
Turkish Industrialists' and Businessmen's Association – TÜSİAD	1
Minister Representatives	3

### **3.3.2.3. TÜBİTAK-The Scientific and Technical Research Council of Turkey**

Founded in 1963, TÜBİTAK is the supreme organization put in charge of promoting, developing, organizing and coordinating research and development in the fields of exact sciences in Turkey in line with the national targets of economic development and technical progress.

It functions under the fold of the Prime Ministry with adequate administrative and financial autonomy. The Council's decision-making body is the Science Board, composed of the President and 12 members. The President, as the chairman of the Science Board implements its decisions and is the head of the entire administration.

#### **3.3.2.3.1. Functions**

TÜBİTAK's main functions have been set as the following:

- Determining Turkey's science and technology policies;
- Supporting, encouraging and coordinating scientific research;
- Establishing and operating special institutes to conduct research and development activities geared to the targets of the five-year economic development plans and the priorities set by the Science Board;
- Providing scholarships and other support to researchers and organizing contests to discover and train future scientists.
- Supporting R&D activities and innovations in industry, promoting university-industry collaborations and establishing techno-parks to facilitate their realization.

- To implement tasks undertaken through international scientific and technical cooperation agreements;
- Publishing scientific journals, as well as books and monthly popular science magazines that make science accessible to the public;
- Supporting scientists and researchers with awards and programs that incent scientific publication ([www.tubitak.gov.tr](http://www.tubitak.gov.tr)).

#### **3.3.2.4. Turkish Telecommunications Co. Inc.**

"Postahane-i Amirane" has been established on 23.10.1840 by Sultan Abdülmecit.

By separating the telecommunication and Postal services in PTT from each other, Turkish Telecommunications Co. Inc. was founded in 24 April 1995. Until 31 December 2003 Turkish Telecommunications Co. Inc. is the monopoly in voice communication, then it is scheduled to privatise Turkish telecom market which is the world's 11th largest.

Turkish Telecommunications Co. Inc. became a joint-stock company, dependent on special law provisions in 29 January 2000 ( <http://www.telekom.gov.tr>).

Turkish Telecommunications Co. Inc. is a world-class operator in terms of line capacity, service variety and staff size. According to the ranking published in the 27 November 1997 issue of the magazine Communications Week, it was among the first 50 in the world. In terms of the distribution of its revenue and workforce, the conventional telephone service was its main line of service, as was the case with its counterparts abroad. Prior to the leap forward in the use of digital technology, the basic task of Turkish Telecommunications Co. Inc. (which was then called the PTT ı Post, Telephone and Telegraph Authority) was to increase expansion of the telephone service. In concert with the government policy in this



direction, Turkish Telecom carried out this task with success. Compared with other countries at a similar level of development in this sector, it was observed that Turkish Telecom was the most successful operator in terms of raising teledensity across the country.(TUNEA, 1999).

### **3.3.2.5. KOSGEB Euro Info Correspondence Centre (EICC)**

Euro Info Correspondence Centre (EICC) Turkey has been established in September 1994 as a section of Information Systems and Electronic Commerce Department at KOSGEB to meet the information and business cooperation needs of SMEs.

KOSGEB EICC has held the position of promoter of information usage throughout the country, but it has also been itself producer of information and performed its activity to speed up the process of the internationalisation of the Turkish SMEs (<http://www.kobinet.org.tr/kosgebabm/english/about>).

#### **3.3.2.5.1. The objectives**

- to promote the cross-border cooperation activities of SMEs,
- to assist SMEs to accomplish their cooperation agreements concerning joint venture or foreign investments matters,
- to reply to general, legal and business administrative inquiries about Turkey asked by EIC Network, foreign institutions or companies either by using her own information sources or directing requests to related organisations.

To guarantee the highest quality level of her services, KOSGEB EICC works in close collaboration with Turkish and Foreign institutions.

KOSGEB EICC is the active member of some SME Support Programs of the European Commission such as;

- Euro Info Centre (EIC) Network,
- Bureau de Rapprochement des Entreprises (BRE) and
- Business Cooperation Network (BC-NET).

#### **3.3.2.5.2. KOBİ-NET (Small and Medium Information Network) and E-Commerce Services**

EICC has established her own intranet, called as **KOBİ-NET** (Small and Medium Enterprises Network), using internet infrastructure in Turkey in order to expand her services and geographic area and access to more wide spread SMEs in the country. Information services, advice and assistance services are provided for the business cooperation services of SMEs by intermediary organization, namely Information Providers.

KOBİ-NET is the first project that gets financial aids from European Union in order to develop e-commerce and support SMEs.

There are 20 institutions functioning as information provider within KOBİ-NET, as well as serving for the promotion of SME support programs of DG Enterprise via KOBİ-NET. In other words, these institutions take place as Information Providers within KOBİ-NET, are composed of various institutions like; unions, associations, banks, foundations, chambers, etc. Some of the biggest banks have joined to the Information Providers System. These banks namely; Halkbank, Yapı Kredi Bank, Vakıfbank. Since each of these banks has approximately 200-300 branches in the country, the information and cross-border cooperation services have spread through the country. In addition to that some of the KOSGEB Service Centres, which has the capability of giving these services are also functioning as the Information Providers in the system.

EICC use offline / online instruments for information services and international networks for business cooperation services. KOBİ-NET offers basic services to Turkish SMEs for Electronic Commerce like; e-mail, web page, etc. and opportunity to access to KOSGEB EICC and other SME institutions' services easily.

KOSGEB EICC also collects up-to-date profiles of Turkish Companies and publishes in 6 languages (Turkish, English, French, German, Italian and Spanish) on KOBİ-NET Web site (<http://www.kobinet.org.tr/kosgebabm/english/about>).

#### **3.3.2.6. Turkish Grand National Assembly Information and Information Technologies Group**

The main objective of Information and Information Technologies Group are to contribute information and information technologies development inside and outside of Turkish Grand National Assembly, to comment on the related laws by considering opinions of related public organizations, universities, research councils, private sector representatives and civil community organizations in corporation with Industry and Trade, Energy and Natural Resources Information and Technology Commission in Turkish Grand National Assembly.

Deputies are the members of this group. Undersecretary of the State Planning Organisation, President of State Institute of Statistics, President of TÜBİTAK, President of Informatics Association Of Turkey, President of Turkish Informatics Foundation and President of Turkish Intelligence Foundation attend to the group meeting because of their relation to the topic (TBMM Bilgi Ve Bilgi Teknolojisi Grubu Çalışma Esasları).

Between these organizations some organizations are seen more important. These are Science and Technology High Board, Internet Committee and

Electronic Commerce Coordination Board. Evaluation of these organizations is in Table 9 and 10.

### **3.3.3. Civil ICT Organizations in Turkey**

Civil ICT organizations are effective in policy making about ICT. Even they are more effective than the public organizations in policy making.

Main civil ICT organizations are:

- Internet Foundation
- Informatics Association Of Turkey (TBD)
- Informatics Services Association Of Turkey (TUBİSAD)
- Informatics Industry Association Of Turkey
- Turkish Informatics Foundation (TBV)
- Informatics Industry Association Of Turkey (TÜBİSAD)
- Turkish Electronics and Information Industries Association
- Turkish Intelligence Foundation (TZV)

#### **3.3.3.1. Turkey ICT Convention**

ICT Turkey ICT Convention was held in 10-12 May 2002 in Ankara. The organizations that organize the Turkey ICT Convention:

- Undersecretary of Prime Ministry
- Informatics Industry Association Of Turkey
- Informatics Association Of Turkey
- Turkish Informatics Foundation
- Turkish Intelligence Foundation

**Table 9 Effectiveness Information Infrastructure and Knowledge Society Bodies**

	Science and Technology High Board		Internet Committee		Electronic Commerce Coordination Board	
	Target	Effective	Target	Effective	Target	Effective
Coordination between public organizations	Yes	No	Yes	Partially	Yes	Not applicable
Partnership between public and private sector	Yes	Partially	Yes	Partially	Yes	Not applicable
Policy making in public and private sector	Yes	Partially	Partially	No	Yes	Not applicable
Resources	No	No	No	No	No	Not applicable

Source: TUJENA Sonuç Raporu, Tablo 12

**Table 10 Effectiveness of Regulatory Bodies**

	RTÜK		Communications High Board		General Directorate of Telecommunications	
	Target	Effective	Target	Effective	Target	Effective
Licensing	Yes	No	No	—	Yes	Yes
Network access regulation	No	No	No	No	Yes	Partially
Defining End User Fee	No	No	No	No	Yes	Partially
Establishment and managing Universal service funds	No	No	No	No	No	No
Operator responsibilities	Yes	Partially	No	No	Yes	Partially
Control, punishment, problem solving	Yes	Partially	Yes	No	Yes	Partially
Researches about policies and social effects	No	No	Yes	Partially	Yes	Partially
Managing competition	No	No	No	No	No	No
Managing frequency range	Yes	Partially	No	No	No	No
Consumer rights, complaints	No	No	No	No	No	No

Source: TUENA Sonuç Raporu, Tablo 13

The objectives of ICT Convention are:

- Making of national policies,
- Determining of continuous participated mechanisms,
- Defining strategies for the reengineering of Government by ICT,
- Building law infrastructure,
- Establishment of a concrete “Action Plan”, and related mechanisms,
- Defining national organization model,
- Defining human resource requirements,
- Observing targets and developments of E-Turkey for E-Europe+

There were 6 working groups in the ICT Convention; education, e-government, law, economy, development of the sector and telecommunication infrastructure.

### **3.4. Applied Projects in order to increase ICT Usage**

#### **3.4.1. ULAKNET**

Turkish Academic Network and Information Center (Ulusal Akademik Ağ ve Bilgi Merkezi, ULAKBİM) has been founded as a service unit, in association with the Scientific and Technical Research Council of Turkey (TÜBİTAK), in 1996.

*Network Technologies Department (ATB) of ULAKBİM*, undertakes the establishment and operation of the Turkish Academic Network (UlakNet), an interactive system based on new technologies, which connects the innovation centers to each other in the national scale. ATB fulfils the functions of providing information technology support, primarily computer networks, to the national innovation system, and carrying out research and development work in the field of information technologies, primarily on network information processing, with the purpose of enabling the information services to be given over the network. The nodes connected to UlakNet are; (<http://www.ulakbim.gov.tr/ulaknet/>)

- Universities,
- Research and Development Organizations,
- Governmental Organizations,
- Military and Police Academies.

### **3.5. Turkish National Information Infrastructure Masterplan (TUENA)**

The initiative for Turkish National Information Infrastructure (TUENA) Masterplan started in January 1996 with an order from the Prime Ministries office. The order delegated coordination duty to prepare the masterplan to the Transportation Ministry and it requested Turkey's Scientific and Technical Research Council (TÜBİTAK) to act as the secretariat unit. Prime Ministry's written statement drew the framework for the Masterplan which assigned "to develop an information sector policy --including internet-- for improving information technologies and for enabling Turkey's transition to a knowledge society with keeping in mind the following points: public security, public interest, socio-economic aspects, legal and institutional aspects." Following negotiations with interested institutions the framework protocol was signed in March 1997 among the Ministry of Transportation, TÜBİTAK, Turkish Technology Development Foundation (TTGV), Turkish Electronics Industrialists Association (TESİD), and Turkish Telecom. Following the approval of the Ministry of Finance, TUENA started in July 1997. TUENA comprised of four work packages in concert with a long-term strategic planning approach.

Those packages were:

- Monitoring Environment (Turkey and the world).
- Infrastructure Planning





would be refined. The universal service fund, which is applicable in U.S and Europe, is not applicable in Turkey.

National Information Technology Council was supposed to be the first step in realizing TUENA goals. The main function of the council would be to make suggestions in the Prime Ministry's political decisions in this subject. ICT structure would be established after TUENA. This could not be applied because of some obstructions (Geray, 2003).

### **3.5.2. Informatization of the Government**

Because of slow bureaucratic procedures and paperwork, lack of resources, lack of training and lack of coordination, ICT usage is not enough in Turkey. TUENA offers the following functions should be incorporated into the new body:

- Assessing or measuring communication and broadband infrastructure needs of all public sector institutions.
- Preparing a masterplan, in order to plan informatization of public institutions.
- To work to increase salaries of the informatics personnel within the public sector
- Benchmarking public institutions regarding, carrying their functions over the national information infrastructure
- Operating the public-net segment of the National Information Infrastructure
- Helping to coordinate public procurement activities as an industrial policy tool
- Initiating pilot applications on the network with the participation of the private sector
- Training public sector informatics personnel

In order to fulfill those functions, TUENA (Turkish National Information Infrastructure Masterplan) offers the body, which may be named, as "Government Knowledge Society Agency" and this body should have following specifications:

- A coordinative structure without the authority of handing down top-down directives. Its respectability should come from power of knowledge.
- Has legal responsibilities to overcome financial and other shortages
- Immune from daily political strifes and periodical measures to limit public spending
- A structure capable of bringing private sector and public sector together
- It should be set up as an institution in accordance with Constitutional Article 123 with a private budget and with an autonomous management like the Capital Market Board (SPK) under the auspice of the Transportation Ministry.
- The board of the agency should be formed with the participation of qualified personnel from public service ministries. (TUENA-Turkish National Information Infrastructure Masterplan, [www.bilten.metu.edu.tr](http://www.bilten.metu.edu.tr))

## **CHAPTER 4**

### **DEVELOPMENT OF ICT IN IRELAND**

Ireland was in an economic and political union-the United Kingdom of Great Britain and Ireland- for the 120 years up to 1921, and the severe economic difficulties experienced during this period were instrumental in creating the desire to secede from that union. The economic policy goals of the independent Irish state, apart from those shared by all European states, were the industrialisation of the country, and increased agricultural production based on the maximum number of family farms. For over three decades these goals were pursued by industrial protectionism and supply of agricultural produce to the large British market.

In the 1950s this policy of protectionism was re-evaluated when it failed to prevent severe balance-of-payments crises, rising unemployment and large-scale emigration. It was decided that further industrialisation and greater prosperity required export-led growth and greater participation in the international economy. On moving towards free trade, the state undertook intensive study of the strengths and weaknesses of indigenous manufacturing and established an industrial policy with a wide range of incentives for both Irish and newly arriving foreign firms. This industrial policy has been at the centre of Irish economic policy ever since.

In 1973 Ireland joined the EU following a national referendum where the electorate overwhelmingly voted in favour of membership. Ireland's entry in to the



The economic growth has given the Irish a new dimension, Irish government aims to turn the country into the e-commerce hub of Europe, and an international Internet business centre. So some actions were taken into consideration as: the telecommunications sector has been privatised and largely deregulated, the Information Society Commission, created in 1997, promotes greater personal and business use of the Internet, an investment in a state-of-the-art, high speed and high capacity global telecommunications network was announced in 1999, in an effort to make the country a more attractive location for start-ups, the government fast-tracked an e-commerce bill in early 2000 giving legal recognition to electronic signatures and legal standing to electronic, the Industrial Development Authority, the agency in charge of promoting foreign investment through some of the most attractive incentive packages in Europe, has added e-commerce to the list of businesses it targets.

#### **4.1. Objectives of Ireland**

Ireland's economic growth rates over recent years have been consistently among the highest of the OECD countries. Exports account for over three quarters of national output. The success of the Irish economy has been due, in large measure, to the contribution of overseas companies, which have found Ireland to be a highly competitive location from which to serve international markets. That competitiveness has been greatly enhanced by Ireland's membership of EMU (Achieve European Competitive Advantage in Software page 1).

Ireland has the largest ICT-producing sector relative to GDP and is the only OECD country in which ICT manufacturing activities are mainly oriented towards computer and related equipment (more than 50%). Along with Finland and Korea, Ireland is also the only OECD country for which the ICT manufacturing sector is

larger than the ICT services sector. This was also the case in Japan in 1995 but the situation has changed owing to strong growth in the telecommunication services sector.

In most cases, the ICT services sector accounts for more than two-thirds of the overall ICT sector in terms of value added. In about half of the OECD countries for which data are available, ICT services industries accounted for between 9% and 11% of business services value added. The share is highest in Ireland, where in 1999 almost 15% of business services value added originated from ICT services, mainly owing to the large share of the computer and related services industry (OECD Information Technology Outlook 2002 page 30).

Ireland, North and South, is believed to have tremendous opportunity to become a European centre for e-Business. Already she is a European leader in telecommunications-based sectors such as telemarketing and call centres. She aims to become leaders in the field of e-business as she has many advantages.

- Many overseas companies are based in Ireland, including a number of leading US data-centric and web-centric companies (Table 12).
- There is a significant software capability.
- There are favourable corporate tax regimes in place. This low corporate tax regime is being extended to all traded activities and will apply to e-businesses.
- English, the language of the World Wide Web and Internet, is commonly spoken. In addition, there are facilities for other languages.
- Ireland is the only English-speaking nation using the euro.
- Northern Ireland, using Pounds Sterling, is the only English-speaking country in Europe sharing a land boundary with a European country using the euro.



- There is a young population that easily adapts to the Information Age.

Traditionally, the island's geographic position on the edge of Europe and its isolation from continental Europe as a marketplace has posed a strategic challenge to businesses.

**Table 12** Number and Employment in Overseas IDA Client Companies in Ireland 2001

<b>Country of Origin</b>	<b>Number of Companies</b>	<b>Total Employment</b>
Australia	10	318
Austria	2	288
Belgium	13	899
Bermuda	7	191
Canada	25	2,403
China	1	12
Denmark	10	2,347
Finland	5	407
France	43	2,943
Germany	149	11,585
Ireland	33	2,170
Israel	1	59
Italy	20	522
Japan	39	2,726
Korea South	11	196
Luxembourg	5	183
Netherlands	37	2,244
Norway	1	47



Portugal	1	2
Saudi Arabia	1	31
South Africa	7	57
Spain	4	27
Sweden	26	3,064
Switzerland	27	2,579
Taiwan	2	106
Turkey	7	20
United Kingdom	138	8,604
United States	501	90,173
TOTAL	1,126	134,203

Source: Ireland Vital Statistics, 2003

## **4.2. Ireland ICT Usage and Infrastructure**

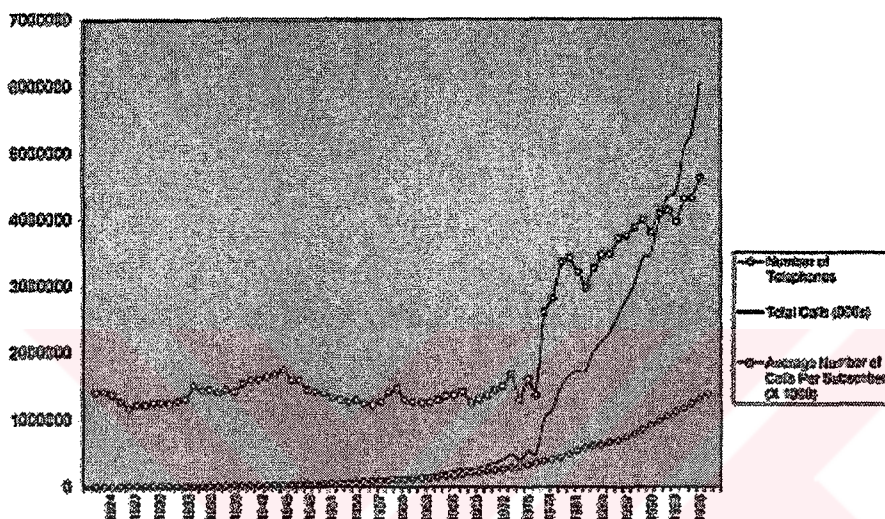
### **4.2.1. Telecommunications**

Ireland's traded sector makes it one of the most open and trade-dependent countries in the world. Good international communications are vital to export-oriented services and industries. The Irish telecommunications market is very competitive and foreign firms are not discriminated against.

#### **4.2.1.1. Socio-economic, political and institutional factors which have served to shape the development of telecommunications services and policy in Ireland.**

Telephone is one of the most widely used technologies. Similarly household users can no longer consider access to the plain old telephone system

(POTS) as a matter of discretionary expenditure- as part of the prevailing *consumption norms* the telephone is an essential tool for effective participation in these societies (Preston & Flynn, 1999).



**Figure 9** Telephone development 1922-1997 basic indicators.

Source: Flynn (1998). &The development of universal telephone service in Ireland, 1880-1993' (Unpublished, PhD. Thesis).

And the necessity of using a telephone system can be seen in Ireland as the other part of the world. Ireland's telephone development history can be seen in Figure 10 based on some basic indicators such as: number of telephones, total calls and average number of calls per subscribers. As it can be seen from the figure, the second half of the 1940s shows a 'take-off' in subscriber numbers in Ireland (the curve does not quite capture actual demand since the second half of the 1940s saw the emergence of a waiting list that would continue to increase in size until 1980 when it peaked at around 100,000 applicants). Related to this, from the mid-1960s onwards the Department of Posts and Telegraphs deliberately moved to dampen demand by requiring seven years rental in advance from prospective subscribers.

A more useful indicator of the increasing utility of the system may be derived by examining the average number of calls per subscriber. It is interesting that the increase in subscriber numbers beginning in the immediate post-war period does not lead to a significant increase in calls per subscriber and calls per subscriber remained remarkably fixed until the mid-1970s. Ireland became an antithesis for suggestion of technology-driven 'system effects', i.e. that the development of the subscriber numbers of itself axiomatically leads to a change in the behaviour of individual subscribers.

The early Irish subscriber base was quite different to that characterising the modern system. Early users had clearly identifiable information needs that did not necessarily require a large installed user base. Thus early adopters in Ireland consisted almost exclusively of business and institutional users, most notably the Dublin Metropolitan Police and Dublin Fire Brigade from 1882 onwards. This occurred despite an explicit effort on the part of the privately owned Telephone Company of Ireland to market the phone as a domestic appliance from as early as 1884. Its initial failure as a domestic implement (in fact the telephone would not pass 50% household penetration until 1985 in Ireland) suggests that business demand almost exclusively drove the slow adoption of the telephone in Ireland up till the 1940s. As late as 1930, business sets accounted for more than 85% of the installed base of 29,500 telephone sets.

Ireland would appear to offer an ideal location for telephone network development since Irish population density has been amongst the lowest in Europe over the course of this century (and indeed it consistently declined between 1900 and 1970). Thus outside the eastern conurbation and a few other cities (or large towns), Ireland has been characterised by relatively isolated but also highly self-contained and self-reliant villages. Yet this had the opposite effect

of engendering a demand for communication networks, instead contributing to the development of a localist bias in Irish culture, rejected in a preference for face-to-face contact, a fact frequently noted in studies of Irish political culture. There was thus no perceived supervening social necessity for the telephone. (Nor did a high level of emigration since the mid-nineteenth century create such a necessity - the letter post remained the primary connection between emigrants and their families at home and the telegram in emergencies.)

But Second World War played a crucial role in the Irish innovation-decision process with regard to the telephone. Wartime (and indeed post-war) fuel rationing led to a substantial reduction in both private and public road traffic levels. Contemporary Irish Department of Posts and Telegraphs memos explicitly identify this as encouraging increased use of the telephone network:

the telephone has been used to an abnormal extent by the commercial community and private persons owing to the general transport difficulties and problems of trade arising out of the emergency (Department of Posts and Telegraphs, 1944, 16 October).

... every added limitation of ordinary public facilities transport, fuel, supplies, etc. - seems, by reason, no doubt, of the upset to normal activities, to react immediately upon the telephones (Dial Debates, 1943, 1944).

As a result the Department of Posts and Telegraphs noted that 'during the Emergency all classes of people have acquired the habit of using the telephone extensively and it may be taken that the service will be used more and more in the future' (Department of Posts and Telegraphs, 1944, 16 November). Thus war conditions led a portion of the population to explore the potential of the telephone sooner than might otherwise have been the case. Assuming that those individuals who were pressed to use the telephone in these unusual circumstances were impressed by its utility, it is logical to conclude that they

would have been amongst the first to apply for telephone service once the war was over (especially during a brief consumer spending boom in 1946-1947).

The post-war investment took place in different circumstances. The war years had facilitated the development of 'the telephone habit' (as the Department of Posts and Telegraphs termed it) among new sections of the population. However the programme funded by the investment also differed from the experiments of the 1920s and 1930s. Specifically the state explicitly set out to install public call boxes in the country's 900 sub-post offices (effectively creating the skeleton of a nation-wide telephone network in the process) and to treble the private subscriber base by 1960.

The period from 1945 to 1975 can be represented a time of social learning for the Irish people (Flynn, Preston, 1999). In Ireland, the oil shocks of 1973 and 1979 lead to sporadic but nation-wide fuel shortages and petrol price rises, severely reducing the level of road journeys. Once again face-to-face contact was forcibly curtailed. In contrast to the immediate post-war period when the existing subscriber base was too small to permit the wartime traffic increases to be sustained, subscriber numbers had, by 1970, passed a critical mass point which made it possible to build on the oil crisis imposed increase in call traffic. Thus the oil shock increase in per subscriber usage acted as a trigger for the subsequent increase in the average number of calls per subscriber.

The remarkable investment between 1981 and 1984 (to date the most expensive period of sustained investment) associated with the post-Dargan Report's 'accelerated development programme' (ADP) was predicated on the understanding that having under-invested in the service over the previous sixty years that only a sudden injection of capital would allow the system to cope with the dramatically increased demand of the 1970s. Indeed the intention of the ADP

was to place the service on a footing whereby it would never fall so far behind demand again. Once the ADP was complete, Telecom Eireann which took over the running of the national telecommunications in January 1984 moved swiftly to capitalise on the newly developed system it inherited, actively marketing the telephone to business and in particular residential customers via a series of pricing and service innovations. Clearly, then the investment of the first half of the 1980s were a prerequisite for the remarkable expansion in subscriber numbers which has been ongoing since the latter half of the 1980s.

#### **4.2.1.2. Current Situation**

Ireland has already invested US\$5 billion in the telecommunications infrastructure over the last 10 years and offers a reliable fully digital telecommunications system. This substantial investment means that Ireland has one of the most advanced telecommunications systems in Europe.

Among the implications of the digital revolution is that every business, small or large, trading domestically or internationally, needs to plan and prepare for e-Business. Ireland is moving towards establishing itself as a leading European location for digital business. The de-regularisation of the Irish Telecoms market last year heralded major changes in telecommunications in Ireland. Significant investment in backbone network is expected over the coming years and operators such as Eircom, Esat Telecom, OCEAN, MCI WorldCom and NTL have revealed plans to roll out additional fibre.

In 1998, the telecommunications market was liberalised in Ireland and new legislation will be brought forward to enhance the regulatory framework in order to enable increased competition. In addition, the recent enactment of the e-Commerce Act (2000) in Ireland and the UK ensures that electronic agreements



are undertaken in an environment of trust and certainty. We have seen the Global Crossing international connectivity deal, which places Ireland as a leader on the international broadband map. In Northern Ireland initiatives such as the Information Age Initiative have shown there are opportunities to be grasped by all in the Information, Communications and Technology sector.

Telecommunications operators in Ireland and Northern Ireland have continued to invest significant sums in developing worldclass broadband infrastructure. At the time of writing, there are over 200,000 fibre kilometres on the island of Ireland, the availability of co-location space is forecast to grow by 700% in the next 18 months, and international connectivity into and out of the island is now described in terms of Terabit and Petabit capacity.

Most companies' first venture on to the Web is a site to provide information and contact details. The key step toward success, in the increasingly competitive markets of the digital age, is to directly interact with customers, suppliers and the rest of the socio-economic system through this Web presence. That is, to permit business interactions, which naturally follow-on from access to that information, to also take place through that same electronic medium, independent of geographic location, international boundaries and time zones.

Eircom (formerly Telecom Eireann) was established as a separate corporate entity in 1984. The company was the exclusive provider of telecommunications services until the process of liberalization of the Irish telecommunications market began in the early 1990s. Since 1994 competition has existed for international and long distance telephone calls, and since 1997 in mobile communication. The government permitted other companies to build their own fibre optic cable networks rather than use the lines leased from Telecom Eireann in 1997. The telecommunications market was liberalized in 1998. Today there are about 30

licensed telecom operators in Ireland. In 1999 Telecom Eireann was fully privatised in the largest equity offer in the country's history. The company then changed its name to Eircom.

Since 1994 the costs of telephone calls have gone down but are still considered high, and an important impediment to greater use of the Internet. Basically, the cost of international and national calls has gone down but this has not been the case for the local loop, the link between Irish homes or small businesses and the national telecommunications infrastructure and, ultimately, the Internet. Despite the Irish telecommunications market being generally competitive, the local loop is still effectively controlled by Eircom. The Office of the Director of Telecommunications Regulation (ODTR) took Eircom to court claiming that the company was abusing its dominant position in the local loop in 1999. Eircom challenged an order by ODTR to lower the prices the company charges its competitors for access to its infrastructure. The government announced its decision to end Eircom's control of the local loop and the European Commission announced that all member countries should have plans for the complete liberalization of the local loop by the end of the year, a move that was expected to dramatically lower Internet access. Still, while the Irish government has pushed its own scheme to liberalize the local loop, Eircom and its competitors have not been able to reach an agreement on how much should the former charge for accessing the local network.

In an effort to attract foreign e-commerce investment as well as retain the existing foreign investment in the country, the Irish government announced in 1999 a new submarine fibre-optic super highway called Global Crossing that will increase the country's international network capacity to the US and 24 European cities. The



Irish government then sold the initial capacity it purchased to telecommunication providers at a price slightly above wholesale (Guillen & Suarez, 2001).

#### **4.2.2. Software Sector**

Ireland has become the European manufacturing and distribution centre for the software of many of the world's top software vendors, accounting for over 40% of all packaged software and 60% of all business software sold in Europe.

Ireland exported USD 3.8 billion in 2000 , 30% of total OECD exports of software products (OECD Information Technology Outlook 2002).

According to the OECD Information Technology Outlook 2000, Ireland is the largest exporter of software goods in the world. The USA and Ireland are by far the main exporting countries, accounting for almost two-thirds of OECD exports of software goods in 1998 (IDA Ireland).

There are currently 840 software companies employing over 30,000 people in Ireland. The top ten independent software companies in the world have significant operations in Ireland. Over 140 overseas software companies employ 15,000 people and use their operations in Ireland to carry out a broad range of activities including core software development, product customisation, software testing and fulfillment. Software development has a range of applications in mobile communications, electronics, engineering, enterprise resource planning, database management, B2B solutions software, banking, insurance solutions and internet security systems. Consultancy services and systems integration companies use Ireland as a base to support international business clients in design development, customisation and implementation of total-business systems and products. An increasing number of companies are also providing technical support to customers worldwide via toll-free support centres located in

Ireland. A number of software companies in Ireland, some of which originated as small Irish start-up companies, are leading their markets with innovative middleware and internet solutions.

The reasons of that software companies choose Ireland as their location are as follows:

- Low tax

Profits derived from eligible manufacturing and qualifying services were subject to a tax rate of 10%, until 31 December 2002. From 1 January 2003, a corporation tax rate of 12.5% has been applying to trading profits in all sectors, including manufacturing and international services.

- Competitive costs

Ireland offers a cost-competitive environment for software companies. Employment costs are a major incentive for new companies and for the existing base of companies to expand and develop their operations. A productive and flexible workforce further enhances this cost advantage.

- State-of-the-art telecommunications

Ireland has an advanced and competitive telecommunications systems in Europe. The market is deregulated and currently over twenty companies compete on the basis of value-added services. Ireland' national telecommunications backbone is over 98% optical fibres.

- Research partnerships

Links exist between industry and independent research centres. Over 30 university and college-based centres of excellence have been established (Achieve European Competitive Advantage in Software).

### **4.2.3. Electronics Sector**

Ireland is one of the attractive locations in Europe for investment in electronics. Over 300 electronics companies develop, market and manufacture a wide range of leading edge products in Ireland. These companies generate a third of the country's total exports and employ over 36,000 people. Since 1980, 40% of all US new inward investment in European electronics has come to Ireland. They have chosen Ireland because of the following reasons of this are as follows:

- **Low tax and generous incentives**

Profits derived from eligible manufacturing and qualifying services are subject to a tax rate of 10% until 31 December 2002. From 1 January 2003 a corporation tax rate of 12.5% has been applying to trading profits in all sectors, including manufacturing and international services. The tax position of companies carrying out approved activities prior to 31 July 1998 will remain unchanged.

- **Ready availability of skilled staff**

Ireland has well-educated young people with appropriate technological and business qualifications to meet all staffing needs.

- **Low costs**

The costs of operating in Ireland, including employment costs, are lower than in most other European countries.

- **World class sub-supply**

Support structure has developed which meets the growing needs of electronics companies in Ireland as well as exporting US\$250 million worth of components a year.

- **Telecommunications Infrastructure**

Ireland's digital telecommunications system enables electronics companies to undertake direct marketing and customer support throughout Europe and to link design and development engineers across the globe.

- Transport logistics

Distribution network delivers to most of Europe within 24–48 hours by truck. An increasing number of companies are gaining additional advantage by centralising their pan-European distribution logistics in Ireland (Achieve European Competitive Advantage in Electronics).

#### **4.2.4. Internet Usage, e-commerce**

As a result of policies implemented by the governments, the number of people using the Internet has grown rapidly in recent years. As of March 2000 there were 592,000 Internet users in Ireland, an increase of 33% from October 1999. However, Ireland's comparative standing has not changed much. Internet using population was about 12% at the end of 1999, a figure that was behind most other European Union countries. There seem to be a number of obstacles that have prevented a more dramatic increase in the use of the Internet. These obstacles include: low PC ownership, low credit card penetration, and a sales tax rate of 21%, higher than in most other EU countries (Reuters, 1999).

In addition to deregulation and investments in infrastructure, private efforts to increase Internet use have included offers of free Internet service. Gateway revolutionized the market in 1999 by offering free access to Gateway.net.

Difficulties to the growth of the Internet include low level of ownership of a personal computer. Mobile-phone penetration per 100 inhabitants (37%) is above the European average. However, only about 2% of adults use WAP enabled

phones to access the and Ireland's cable TV network covers about 80% of homes.

The growth of e-commerce in Ireland is prevented by the low rate of credit card ownership (about 11%), which is lower than the EU average. And a recent survey by researchers at the University of Ulster found that, contrary to expectations, only 8% of Irish businesses have an e-mail address and only 4% have a website. Still, according to the Irish Internet Association, 62% of Internet users have bought on line in the past year (Guile & Suarez, 2001).

#### **4.2.4.1. Government Approach to E-commerce**

The Irish government has moved decisively to prepare Ireland for the e-commerce applications. Initiatives undertaken include the liberalisation of the telecommunications market, a substantial investment programme in broadband infrastructure; and introduction of an e-commerce friendly regulatory environment.

The finalization of two major transatlantic fibre optic cable projects in 2001 has provided broadband connectivity to the USA (and the UK) at very low prices to companies operating from Ireland. These infrastructure investments are part of the medium-term aim to move Ireland along the path of becoming an e-Business hub in Europe.

Within Ireland, a €250 million investment has been earmarked under the National Development Plan to promote the countrywide uptake of e-commerce and Internet use. This initiative is designed to push Ireland into the top ten of OECD countries for broadband connectivity. The first phase policies, which was designed to bring high-speed Internet access to 67 towns around the country was expected to be completed within two to three years, with a subsequent rollout to

another 123 towns within five years. The target is to be the first country in Europe to have such level of broadband service widely available, and to substantially improve online business to business transactions, or numbers of secure web servers for e-commerce, in areas Ireland is relatively weak.

In the regulatory sphere, a significant step forward was the passing of the *Electronic Commerce Act*, which came into force in 2000. This Act deals with electronic signatures and certification authorities, and was signed into law using a digital signature, which will have full recognition under Irish law. It will allow the development of a safe and secure on-line trading environment within Ireland, supporting business and consumer transactions on line, facilitating the development of e-commerce in Ireland, and demonstrating Ireland's internet friendly environment.

An innovative public-private partnership project in inner Dublin is combining urban regeneration with leading edge Internet and business technologies. *The Digital Hub*, which was launched in December 2001, was projected to be fully developed over a ten year time span. It was planned to bring together Irish and international digital media companies in a clustered nine acre development in inner city Dublin. One of the largest urban regeneration projects in the history of the State ( budgeted at €250 million) will combine fine arts-based disciplines such as film production and graphic design with computer based technologies to create digital content for broadband and internet transmission (Ireland Economic Profile).

#### **4.2.5. Regional Database of Infrastructure**

In order to facilitate a more efficient spatial distribution of the enterprise sector, the Tánaiste and Minister for Enterprise, Trade and Employment requested

Forfás to organize a database of the physical and social infrastructure available to support enterprise development in the regions. This project was completed in 2001. The database was intended to help identify the developmental capacity and potential of various locations and regions and pinpoint areas in need of improvement. The project recognises that physical and social infrastructure provides the framework conditions for economic growth, localized development and social progress. The Forfás Regional Database was developed with funding from the Government's Information Society Fund. The database is an internet-based databank of tables and maps of physical and social infrastructure, relating to enterprise development and promotion, and containing details of the agency-supported enterprise base in 123 locations around Ireland, (towns with a population in excess of 1,500, according to the Central Statistics Office, 1996 Census). It includes various categories of infrastructure that are considered essential and significant for the development of the enterprise sector. For each of the towns covered, this infrastructure is described by reference to a list of indicators identifying quantity, quality and sophistication. Moreover, the physical and social infrastructure data is supplemented by further details outlining the number of manufacturing/internationally-traded services facilities supported by the industrial development agencies and employment details, as they apply to each town and sector. The database is accompanied by a geographical information system (GIS) facility, which displays maps of certain physical features like electricity, telecommunications and gas infrastructure, and ports and airports. Furthermore, its' web site acts as a portal, linking the user to the sites of relevant sources of data, infrastructure providers, agencies and departments ([www.infrastructure.ie](http://www.infrastructure.ie)).

#### **4.2.6. e-Government**

The Governments in both parts of Ireland are adopting new models of information and delivery and customer service to citizens and businesses using a single point of access. The aim is to enable the people, who live or work in both parts of Ireland to access the local and public services they need at any time and at any place. The Governments in UK and Ireland are ensuring that appropriate support is in place to encourage the development of e-business and that they are in line with best practice in the rest of the world. Much of this guidance provided by the Government bodies those are directly relevant to their own processes and operations, and the Governments themselves should be major beneficiaries of the "Digital Revolution".

#### **4.2.7. ICT Trade**

Ireland is one of the leading exporters of computer equipment in 2000 with USD 17 billion and it has one of the major import markets for computer equipment in 2000 with USD 10 billion. Ireland's role in assembly and re-export is evident from its USD 10 billion in imports and USD 17 billion in exports of computer equipment in 2000. Ireland's exports of computer equipment have annually increased by 14.5% since 1990.

Ireland too has experienced very strong growth in its trade in communication equipment, with exports increasing from USD 211 million in 1990 to USD 2.8 billion in 2000.

Ireland is a significant exporter of electronic components with USD 4.6 billion in 2000, and Ireland imported USD 3.8 billion of electronic components in 2000.



Ireland is a leading exporter of software products with the United States. (Table 13) Ireland exported USD 3.8 billion in 2000, or almost 30% of total OECD exports of software products.

**Table 13 Software products: leading exporting countries, 2000**

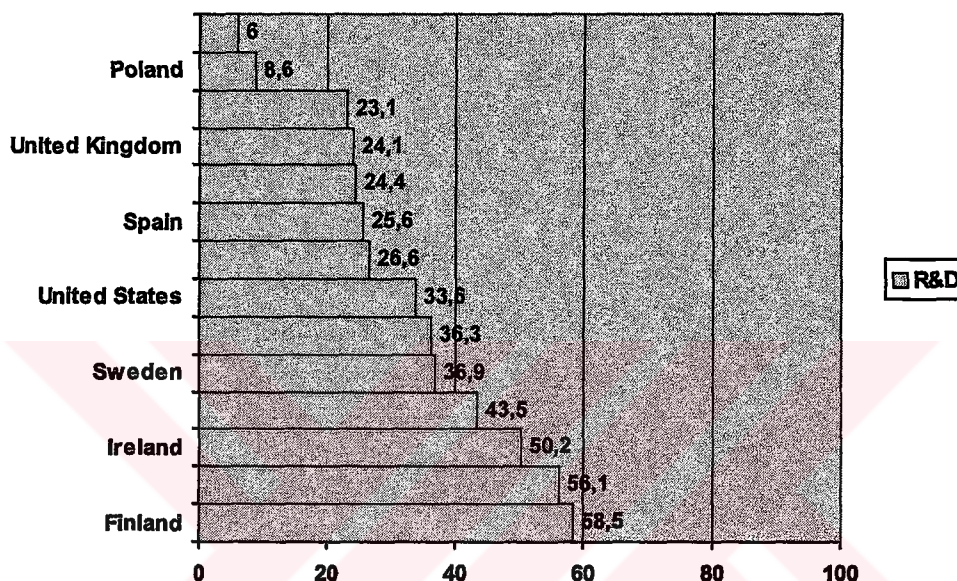
<b>Exports</b>	<b>USD millions</b>	<b>Share(%)</b>
Ireland	3 819	29
United States	3 382	26
Netherlands	1 079	8
United Kingdom	895	7
Austria	780	6
Germany	702	5
France	483	4
Japan	317	2
Belgium	308	2
Canada	241	2
OECD	13 051	100
EU	8 618	66

Source: OECD IT Outlook 2002, Table 5

In 2000, Ireland, with its very large software industry, was the leading exporter of computer and information services, which were worth over USD 5.4 billion (OECD IT Outlook 2002).

#### 4.2.8. Research and Development

In 1999, the ICT sector accounted for more than one-quarter of total business R&D expenditures in most OECD countries, and more than half in Finland, Korea and Ireland (Figure 13).



**Figure 10** R&D expenditure in selected ICT industries, 1999 or latest available year

Source: OECD IT Outlook 2002 page 41, Figure 15

#### 4.2.9. ICT in Education

The Schools IT 2000 project was launched in November 1997 and by the end of the year 2000 more than €50 million of public money was invested for implementing the project. The overall aim of Schools IT 2000 was to ensure that pupils in every school would have the opportunity to achieve computer access and Internet literacy and to equip themselves for participation in the information society.

The National Centre for Technology in Education was established in early 1998 to implement Schools IT 2000. The ICT Policy Unit oversees the NCTE with a

view to ensuring that appropriate provision is made for the development of eLearning for the benefit of all.

The following data on the implementation of Schools IT 2000 was obtained from a survey carried out in June 2000 by the NCTE for the Department of Education and Science.

- There are approximately 56,000 Multimedia Computers in Irish first and second-level schools - an increase of 65% since 1998.
- This translates into an average of 8.7 computers per first-level school, and 42.7 computers per second-level school.
- Pupil: Computer ratios are now 17.7: 1 at first level and 13:1 at second level.
- 78% of second level schools have a Local Area Network (LAN).
- All schools have been provided with an Internet connection since early 1999. Over 90% of schools have used email.
- 69% of second-level schools have an ISDN connection and 62% have multi-user Internet access.
- 8% of first level schools and 11% of second level schools have websites on which school details and student work is published.
- In first level schools there is a significant increase in the use of ICT in the curriculum.
- This is especially so in English, other modern languages, learning support and mathematics.
- The main determinant of pattern of access is teacher skill. 25% of first level schools report having a deliberate strategy for access.
- 78% of second level schools offer certification in ICT skills to students.

- 5% of teachers have reported that they have done a course. First level teachers were more likely to have done a course (84%) than second level (65%).
- 92% of first level teachers reported having some skill in ICT and 74% having some Internet skill.
- 77% of second level teachers reported having some skill in ICT and 64% having some Internet skill.
- In December 2001 Minister for Education and Science, Dr. Michael Woods, TD, launched a new programme; Blue Print for the Future of ICT in Education. The blue print will see an investment of circa €108m until end of 2003. This investment will build upon the achievements to date. In specific terms, the objectives and strategies of the new Plan are:
  - €78.72m (£62m) capital grant aid for first and second-level schools
  - Priority for Special Needs students
  - €29.2m (£23m) for support services including teacher training,
  - The development of ICT school plans to meet individual school needs
  - Locally based teacher training
  - The development of Education Web resources
  - A new scheme of innovative ICT projects
  - Collaboration with other European countries
  - Partnership with the social partners, with industry and with the broader community.
  - Feedback from schools to determine future priorities

The first phase of grants under the new initiative, some £20 million (€ 25m), issued before the end of 2001. And a further grant has now issued issue to all

primary and second level schools while the third phase will be made available during 2003 (<http://www.education.ie>).

### **4.3. ICT Organization Structure in Ireland**

#### **4.3.1. Policy Makers and Regulatory Bodies**

##### **4.3.1.1. Government**

###### **4.3.1.1.1. President**

The Office of President was established by The Constitution. The President is elected directly by the people. The formal powers and functions of the President are prescribed in the Constitution. The President, who does not have an executive or policy role, exercises them on the advice of the Government.

###### **4.3.1.1.2. Department of the Taoiseach**

The Taoiseach (the Head of the Irish Government) is appointed by the President (one of the three Houses of the Oireachtas) on the nomination of Dáil Éireann (The House of Representatives, the other House is the Senate or Seanad Éireann). The Head of the Irish Government must resign on losing a vote of confidence in the House of Representatives. The Head of the Irish Government answers questions in the he House of Representatives where macro policy is concerned, or where issues specific to his department are concerned. The Taoiseach may also initiate legislation which represents important new developments. The Head of the Irish Government, the Tánaiste (the deputy head of government), and the Minister for Finance must be members of he House of Representatives. The other members of the Government must be members of either he House of Representatives or the Senate but no more than two may be members of the Senate.

The Head of the Irish Government is the central co-coordinator of the work of the Ministers and their Departments of State. The Head of the Irish Government also advises and guides the other members of the Government when faced particularly with issues requiring the successful working of the Government as a collective authority responsible to Dáil Éireann. The Head of the Irish Government sets macro Government policy. The Head of the Irish Government keeps the President informed on domestic and international policy.

The Head of the Irish Government has certain statutory responsibilities for the reform of the law, for official statistics and for the administration of public services which are not the responsibility of any other member of the Government.

The Head of the Irish Government may decide that particular matters are of such importance or breadth that it is appropriate that they should come under the aegis of her or his authority and be brought under the responsibility of the Department of the Taoiseach. At present they would include the Strategic Management Initiative for the modernization of the public service; co-coordinating the contribution to government policy on Northern Ireland and on Irelands relations to the European Union; The Information Society Policy Unit; The National Economic and Social Council the National Economic and Social Forum; the Information Society Commission; the Government Press Service; the National Centre for Partnership and Performance and the coordination of relations with the social partners under the partnership agreements.

#### **4.3.1.2. Forfas-The National Policy and Advisory Board for Enterprise, Trade, Science, Technology & Innovation**

Forfás is the national board responsible for providing policy advice to government on enterprise, trade, science, technology and innovation in Ireland. Legal responsibility for the promotion and development of these sectors is vested by

the State, through the Department of Trade, Enterprise and Employment, in Forfás. The board fulfils its mandate either directly or by delegating responsibility to associated agencies with which it has a close working relationship ([www.forfas.ie](http://www.forfas.ie)).

#### **4.3.1.2.1. Functions**

- Industrial policy development and co-ordination for State bodies such as IDA Ireland and Enterprise Ireland
- The promotion of scientific research and innovation in close association with Science Foundation Ireland and the Irish Council for Science, Technology and Innovation
- Research, analysis and policy advice on competitiveness and economic development, through the National Competitiveness Council and the Expert Group on Future Skills Needs

Forfas operates under the aegis of the Department of Enterprise, Trade and Employment and is the body in which the legal powers of the State for the promotion and development of industry, science and technology are largely vested. It delegates responsibility and second staff to a number of independent agencies for specific purposes.

Irish development agencies

#### **Enterprise Ireland**

Enterprise Ireland is responsible for helping to grow the sales, exports and employment of Irish companies. Also administers national and EU supports for building technological innovation capability and co-operation between industry and higher educational institutions.



### IDA Ireland

IDA Ireland is responsible for securing new investment from overseas and encouraging existing foreign enterprises in Ireland to expand their businesses.

### Science Foundation Ireland (SFI)

SFI invests in academic researchers who are most likely to generate new knowledge, leading edge technologies, and competitive enterprises in the fields underpinning biotechnology and information and communications technology. SFI also advances co-operative efforts among education, government, and industry.

In addition to development agencies which operate under the aegis of Forfas, there are a number of other state agencies involved in economic development.

### Shannon Development

Ireland's only dedicated regional development company. Shannon Development's brief is to generate industry, tourism and regional development in the wider Shannon area.

### Údarás na Gaeltachta

Údarás na Gaeltachta combines an economic development role (that of creating sustainable jobs and attracting investment to the Gaeltacht (Irish-speaking regions) with community, cultural and language-development activities, working in partnership with local communities and organisations. Forfás also acts as secretariat for a number of independent advisory groups.

### The Irish Council for Science, Technology and Innovation (ICSTI)

ICSTI advises the Government on the strategic direction of science, technology and innovation (STI) policy and on specific issues important the development of science and technology in Ireland.



### The National Competitiveness Council (NCC)

The NCC reports to the Government on the key competitiveness issues for the Irish economy and makes recommendations on public policy actions required to enhance Ireland's competitiveness position.

#### **4.3.1.3. Commission for Communication Regulation**

The Commission for Communications Regulation is responsible for the regulation of the telecommunications sector in Ireland in accordance with domestic and EU legislation. As part of this function, the Commission is empowered to grant licenses in accordance with the Communications Regulation Act, 2002 for the purposes of the provision of telecommunications networks and services to the public (<http://www.odtr.ie>).

#### **4.3.1.4. Science Foundation Ireland**

Science Foundation Ireland (SFI) is investing €646 million between 2000-2006 in academic researchers and research teams who are most likely to generate new knowledge, leading edge technologies, and competitive enterprises in the fields underpinning two broad areas:

- Biotechnology
- Information and communications technology

SFI makes grants based upon the merit review of distinguished scientists.

SFI also advances co-operative efforts among education, government, and industry that support its fields of emphasis and promotes Ireland's ensuing achievements around the world (<http://www.sfi.ie>).

#### **4.3.1.4.1. Functions**

The functions of SFI are as follows:

- Advising and assisting the Director General and senior management of the Foundation in formulating and achieving the Foundation's mission.
- Providing for the preparation, implementation, and review of strategies and operational plans that promote the undertaking of basic research of the highest international standards in Ireland—particularly in areas that are related to Ireland's economic competitiveness.
- Ensuring SFI compliance with corporate governance requirements for State bodies.
- Approving annual and multi-annual budgets for the Foundation and ensuring appropriate accountability for the disbursement and management of these budgets.
- Establishing the organisational structures and resources required to enable the Foundation to undertake its functions efficiently and effectively.
- Providing annual and ongoing review of the results, impacts, and organisational effectiveness of the Foundation.

SFI has established an open and ambitious funding scheme and aims to fund proposals that link highly sophisticated research with a vision for the ICT of tomorrow. SFI is interested in research programmes that carry the evolution of ICT forward in the following areas:

- Software and applications, including communications, security, reliability, user-interfaces, and simulation and modeling.

- Components and devices, including photonics, wireless, electronics, or their integration; novel architectures; and nanoscale assembly.
- Networks, including high-speed, broadband, wireless, or mobile transmission; voice, data, or video technology; digital signal processing; network management; switching; and next generation internet.
- Systems, including distributed or parallel systems, and engineering for system reliability, predictability and security.

#### **4.3.1.5. IDA Ireland**

IDA Ireland is an Irish Investment and Development agency with government responsibility for securing new investment from overseas in manufacturing and international services sectors. IDA Ireland also encourages existing foreign enterprises in Ireland to expand their businesses (<http://www.idaireland.com>).

#### **4.3.1.6. Advisory Committee on Telecommunication**

The Advisory Committee on Telecommunications was established in June 1998. The Committee comprised of international communications industry leaders representing diverse areas of expertise and experience and senior Irish officials was charged with the task of advising the Minister, by the end of 1998, on a strategy to position Ireland as a key global centre in advanced telecommunications, the Internet and electronic commerce.

The goal of Advisory Committee on Telecommunication is to promote national economic & social prosperity through Ireland becoming a world leader in the information and communications era by,

- Being a preferred global location for ICT related enterprise and providing a conducive environment for new ventures,

- Achieving a national competitive advantage through the range, quality and cost-effectiveness of telecommunications services available to businesses in Ireland, and
- Ensuring that Irish citizens have access to information and telecommunications services, which rank with the world's best in terms of quality, range and price.

Irish Government's commitment to seeking non-bureaucratic, pragmatic and innovative approaches to establishing Ireland as a global leader in electronic commerce.

#### **4.3.2. Information Infrastructure and Information Society Bodies**

##### **4.3.2.1. Information Society Commission**

The Information Society Commission (ISC) is an independent advisory body to the Government, reporting directly to the Taoiseach. It draws on high-level representation from the business community, the social partners, and government itself. The ISC has a key role in shaping the evolving public policy framework for the Information Society in Ireland. It contributes to the policy formulation process, monitor progress, and highlights issues that need to be prioritised (<http://www.isc.ie>).

##### **4.3.2.2. Irish Council for Science, Technology & Innovation**

In 1997, the Government established the Irish Council for Science, Technology & Innovation to advise it on all aspects relating to the strategic direction of science, technology and innovation policy (<http://www.forfas.ie/icsti>).

#### **4.3.2.2.1. Functions**

The functions of Irish Council for Science, Technology & Innovation are as follows:

- To advise on science and technology policy-related issues in response to specific requests from the Government (through the Minister responsible for Science and Technology) or from the Board of Forfás.
- To advise the Minister responsible for Science and Technology, the Office of Science and Technology and the Board of Forfás, on the Council's own initiative, on policy for science and technology and on related matters.
- To advise the Minister on the strategy for the preparation and implementation of national programmes in science, technology and Innovation.
- To advise the Minister on the strategic direction for State investment in science, technology and innovation.
- The power to establish sub-groups and panels to assist the Council in the performance of its functions.

#### **4.3.2.3. FAS**

FÁS — Training and Employment Authority, was established in January 1988, under the Labour Services Act 1987 to provide a wide range of services to the labour market in Ireland. Its functions as laid down in the Act are:

- training and re-training;
- designated apprenticeships;
- recruitment service;

- employment schemes;
- placement and guidance services;
- assistance to community groups ;
- advice for people returning to Ireland and those seeking employment elsewhere in the EU;
- consultancy and human resource related services, on a commercial basis, outside the State (through FÁS International Consulting Ltd.)

Mission of FAS is "To increase the employability, skills and mobility of job seekers and employees to meet labour market needs, thereby promoting competitiveness and social inclusion".

One of the role of FAS is to maximise the use of information and communications technology (ICT) in the provision of services and in internal processes and systems.

In order to accomplish this some actions will be taken by FAS as follows:

- Developing an ICT strategy and plan for the organisation
- Improving the ICT infrastructure, for both staff and customers, to support flexible working and delivery of services
- Improving ICT training and support for all staff
- Improvements to internal and external communications
- Development of more self service access for customers
- Improving decision making processes, by excellent management information systems

- Investing in the development of FÁS NET College, as a vehicle to promote the increasing use of e-learning, in the delivery of training services
- Participating in e-Government initiatives, by collaborating with relevant organisations to improve on-line access by staff and customers to all FÁS services (<http://www.fas.ie>).

#### **4.3.3. Ask Ireland**

**www.askireland.com** is a Government website, managed by Forfás, to provide a single reference point for the promotion of Irish trade, investment and tourism on the World Wide Web. Launched in 1999, Ask Ireland aims to provide a one stop portal to all information relevant to those interested in buying Irish goods or services, or investing in, visiting or researching Ireland. The site brings together key overseas-oriented departments and agencies of the State to provide an interactive entry point to thousands of pages of information about Ireland. This is in keeping with the philosophy of the Government's information society initiative and goes a long way towards meeting the Government's commitment to ensure transparency in the services provided by public institutions ([www.askireland.com](http://www.askireland.com)).

## CHAPTER 5

### COMPARISON OF IRELAND AND TURKEY

#### 5.1. Mapping ICT Indicators - A Footprint Analysis

88 The Infrastructure, Experience, Skills, Knowledge (INEXSK) approach can be used for cross-country comparisons by using indicators for each of its elements. In this study, indicators were chosen based on data availability and their value on different patterns of development in "information societies". In order to make a comparison between Ireland and Turkey most indicators were based on International Telecommunication Union and Organisation For Economic Co-Operation And Development (OECD) data.

Table 15 and 19 present the indicators and the way they are computed. Three factors are important in constructing the indices. First, it is desirable to adjust for population in measures of infrastructure and skills. A larger sized country will often have a larger infrastructure or a larger number of skilled individuals, but not necessarily higher levels per inhabitant. The graphs of the footprints are developed by connecting the available data points for the index values calculated for each country. At the centre of the diagram, the value of each of the indices is zero and at the boundary of the circle the value is 100. The small circle in the centre of the diagram is used as a means of visualising very low values (that is, less five out of



100). When a line goes inside this circle, the corresponding values of the index are less than five.

In order to compare Ireland and Turkey, indicators were grouped under two key headings:

- Physical Infrastructure and Usage Indicators
- ICT Paradigm Indicators

In order to compare Turkey and Ireland point data (data for a specific period) were used. A year was taken as “base” and the current situation of two countries were compared. Time series (trend) analysis was not used due to following reasons:

- Many technologies or innovations do not have a past history in statistical terms (mostly in Turkey)
- It is nearly impossible to find required past data for both countries (especially for Turkey),
- Footprint analysis is mostly used for comparisons at a certain point in time, although it is possible to trace footprints of a country at different periods.

### 5.1.1. Basic Data

The following country data are used as basic data the footprint analysis.

**Table 14** Population and Households Values for Selected Countries

Country	Population	Households
Turkey <sup>1</sup>	66,275,000	14,600,000
Ireland <sup>2</sup>	3,839,000	1,305,000
Germany <sup>3</sup>	82,433,000	38,456,000
Greece <sup>4</sup>	10,596,000	3,600,000
China <sup>5</sup>	1,312,710,000	355,290,000
Japan <sup>6</sup>	127,291,000	48,015,000

<sup>1</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 165

<sup>2</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 82

<sup>3</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 67

<sup>4</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 70

<sup>5</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 79

<sup>6</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 86

T.C. İÇİŞİLERİ BAKANLIĞI  
TELEKOMÜNİKASYON GENEL MÜDÜRLÜĞÜ  
2017

<b>Country</b>	<b>Population</b>	<b>Households</b>
<b>Finland<sup>7</sup></b>	5,195,000	2,400,000
<b>United Kingdom<sup>8</sup></b>	60,070,000	24,410,000
<b>Mexico<sup>9</sup></b>	100,368,000	21,800,000
<b>Hungary<sup>10</sup></b>	9,973,000	3,726,000



<sup>7</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 61

<sup>8</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 170

<sup>9</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 109

<sup>10</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 77

### 5.1.1.2. Physical & Usage Infrastructure Indicators

**Table 15 Physical Infrastructure and Usage Indicators for Footprint Analysis**

<b>Indicator</b>	<b>Variable Description</b>	<b>Computation used</b>	<b>Country taken as 100</b>	<b>Based Year</b>
Television Index	Number of households, which has a television receiver	Percentage of households with television	United Kingdom	2001
Mobile Telephone Subscribers Index	Number of households in which there is a mobile telephone subscriber	Number of mobile telephones per 100 households	Finland	2001
Internet Hosts Index	_____	Internet hosts per 1,000 households	Mexico	2001
Personal Computer Index	Number of households, which own a PC	Percentage of households with access to a home computer	France	2000
Telephone Network Index	Main telephone lines per capita	Main telephone lines per 100 population	Sweden	2001
E-commerce Index	Secure servers per million inhabitants	Secure servers per million inhabitants	Netherlands	1999

Indicator	Variable Description	Computation used	Country taken as 100	Based Year
Internet Access Index	Number of households, in which a member has access to Internet	Percentage	Germany	2000
Literacy Share	Percentage of population that is literate	Simple percentage	None (100% taken as 100)	
ISDN <sup>1</sup> Subscribers Index	Households, which has a subscription to ISDN	Percent households with ISDN Subscription	China	2001
Cable TV Index	Number of households, which has Cable TV subscription.	Percent households with Cable TV Subscription	Japan	2001

<sup>1</sup> ISDN is Integrated Services Digital Network, a standard for digital telecommunications that allows fast digital dialup connections over the public telephone network.

**Table 16** Data used to find out Physical Infrastructure and Usage Indicators

Indicator	Measure of Value	Turkey	Ireland	Country taken as
Television Index <sup>1</sup>	Number of television equipped households	14,257,000	1,225,000	23,800,000
Mobile Telephone Subscribers Index <sup>2</sup>	Number of Cellular mobile telephone subscribers	19,573,000	2,970,000	4,176,000
Personal Computer Index <sup>3</sup>	Households with access to Internet (percentage)	12,3 <sup>4</sup>	32,4	27
Internet Hosts Index <sup>5</sup>	Number of Internet hosts	106,556	128,092	918,000
Telephone Network Index <sup>6</sup>	Main telephone lines per 100 population	28,52	48,45	73,91
Internet Access Index <sup>7</sup>	Percent of households with access to Internet	7	20,4	16

<sup>1</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 165, 82,170

<sup>2</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 165, 82,61

<sup>3</sup> Source: OECD Information Technology Outlook 2002, Annex Table 6.1. Households and individuals with access to a home computer in selected OECD countries, 1986-2001

<sup>4</sup> Households in urban areas only,

<sup>5</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 165, 82,52

<sup>6</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 165, 82,154

<sup>7</sup> Source: OECD Information Technology Outlook 2002, Annex Table 6.2. Households and individuals with access to Internet<sup>1</sup> in selected OECD countries, 1996-2001

Indicator	Measure of Value	Turkey	Ireland	Country taken as
E-commerce Index <sup>8</sup>	Secure servers per million population	1	26	19
Literacy Share <sup>9</sup>	Percentage of population that is literate	85.6	98	Not applicable
ISDN Subscribers Index <sup>10</sup>	Number of ISDN Subscribers	8,691	43,367 <sup>11</sup>	1,088,200
Cable TV Index <sup>12</sup>	Number of Cable TV Subscribers	909,000	615,000	21,967,000

<sup>8</sup> Source: OECD and Netcraft ([www.netcraft.com](http://www.netcraft.com)), Data Figure 4.1

<sup>9</sup> Turkish data is based on year 2000, source: <http://www.gap.gov.tr/>, Ireland data is based on year 1981 Source: <http://www.1uptravel.com/international/europe/ireland/>

<sup>10</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 165, 82,70

<sup>11</sup> Ireland data is based on year 2000

<sup>12</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 165, 82,86

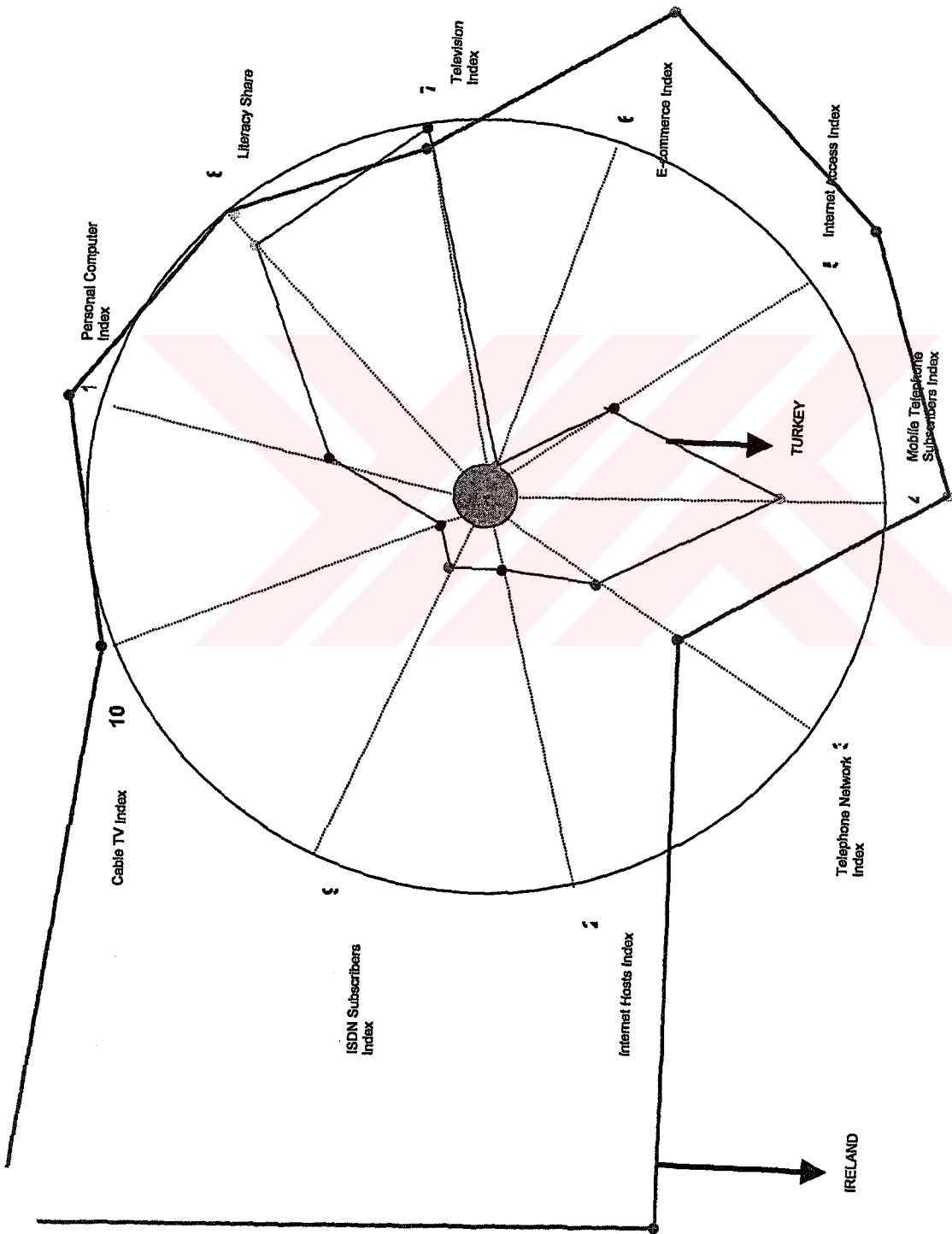
**Table 17** Values for Physical Infrastructure and Usage Indicators

Indicator	Turkey	Ireland	Country taken as 100
Personal Computer Index	12,3	32,4	27
Internet Hosts Index	7,3	98	42
Telephone Network Index	28,52	48,45	73,91
Mobile Telephone Subscribers Index	134	227	174
Internet Access Index	7	20,4	16
E-commerce Index	1	26	19
Television Index	97,6	93,7	97,5
Literacy Share	85.6	98	Not applicable
ISDN Subscribers Index	0,06	3,3	0,3
Cable TV Index	6,2	47	45,7



**Table 18** Index Values for Physical Infrastructure and Usage Indicators

<b>Indicator</b>	<b>Turkey</b>	<b>Ireland</b>
Personal Computer Index	45,6	120
Internet Hosts Index	17,4	233
Telephone Network Index	38,6	60,3
Mobile Telephone Subscribers Index	77	130
Internet Access Index	43,8	127
E-commerce Index	5	137
Television Index	100	96
Literacy Share	85.6	98
ISDN Subscribers Index	20	1,100
Cable TV Index	13,7	103



**Figure 11** Footprint Diagram for Physical Infrastructure and Usage Indicators

### 5.1.3. ICT Paradigms

**Table 19** ICT Paradigms Indicators for Footprint Analysis

Indicator	Variables used to construct indicator	Computation used	Country taken as 100	Based Year
ICT Patent Index	Number of ICT patents as a percentage of total national patents	Percentage	Japan	1998
Telecommunication Index	_____	Telecommunication revenue/GDP	Japan	2001
ICT Export Index	Percentage of ICT sector exports in total merchandise exports.	Percentage of ICT sector exports in total merchandise exports.	United Kingdom	2001
National Strategy Index	Existence of a national strategy (documents, objectives, time-scales, resources, targets)	<sup>1</sup>	Not applicable	Not applicable
Employment Index	Number of Employment in computer and related activities (thousands) Population	Number of Employment in computer and related activities per 1,000 population	Hungary	
ICT strategic alliances Index	ICT sector cross-border strategic alliances	Number of deals by nation of alliance	Finland	2001

<sup>1</sup> See "National Strategy Indicator Index" part

**Table 20 Values for ICT Paradigms Indicator**

Indicator	Measure of Value	Turkey	Ireland	Country taken as 100
ICT Patent Index <sup>1</sup>	ICT patents percentage of total national patents	13,4	17	21,3
Telecommunication Index <sup>2</sup>	Telecommunication Revenue/ GDP	6,398,173x10 <sup>9</sup> / 55,327,991x10 <sup>9</sup> 3	3,200x10 <sup>6</sup> / 115,352x10 <sup>6</sup>	14,337x10 <sup>9</sup> / 503,594x10 <sup>9</sup>
ICT Export Index <sup>4</sup>	Share of ICT sector exports in total merchandise exports	5,3 <sup>5</sup>	39,9	20
National Strategy Index	Existence of a national strategy (documents, objectives, time-scales, resources, targets)	40	87	Not applicable
ICT strategic alliances Index <sup>6</sup>	Number of deals by nation of alliance	3	21	25
Employment Index <sup>7</sup>	Employment in computer and related activities (thousands)	2,7	9,7	14,8

<sup>1</sup> ICT patents as a percentage of total national patents filed at the European Patent Office Source: OECD, Patent database, Data Figure 1.7

<sup>2</sup> Source: Year Book of Statistics Telecommunication Services 1992-2001 ITU page: 165, 82,86

<sup>3</sup> GDP of Turkey, Source: <http://www.die.gov.tr/TURKISH/SONIST/GSMH/310302t.html>

<sup>4</sup> Source: OECD, International Trade in Commodity Statistics (ITCS) and Structural Analysis (STAN) databases, Data Figure 2.19

<sup>5</sup> Turkish data is based on year 2000

<sup>6</sup> Source: OECD Information Technology Outlook 2002, Annex Table 2.36. ICT sector cross-border strategic alliances by OECD countries, 1990-2000

<sup>7</sup> Turkey data is based on year 1998, Ireland data is based on year 1997 and Hungary data is based on year 2000 Source: OECD Information Technology Outlook 2002, Annex Table 3.3. Employment in computer and related activities in selected OECD countries, 1993-2000

**Table 21 Values for ICT Paradigms Indicator**

<b>Indicator</b>	<b>Turkey</b>	<b>Ireland</b>	<b>Country taken as 100</b>
ICT Patent Index	13,4	17	21,3
Telecommunication Index	0,1	0,03	0,03
ICT Export Index	5,3	39,9	20
National Strategy Index	40	87	Not applicable
ICT strategic alliances Index	3	21	25
Employment Index	0,4	2,5	1,48

**Table 22** Index Values for ICT Paradigms Indicator

<b>Indicator</b>	<b>Turkey</b>	<b>Ireland</b>
ICT Patent Index	63	80
Telecommunication Index	333	100
ICT Export Index	26	199
National Strategy Index	40	87
ICT strategic alliances Index	12	84
Employment Index	27	169

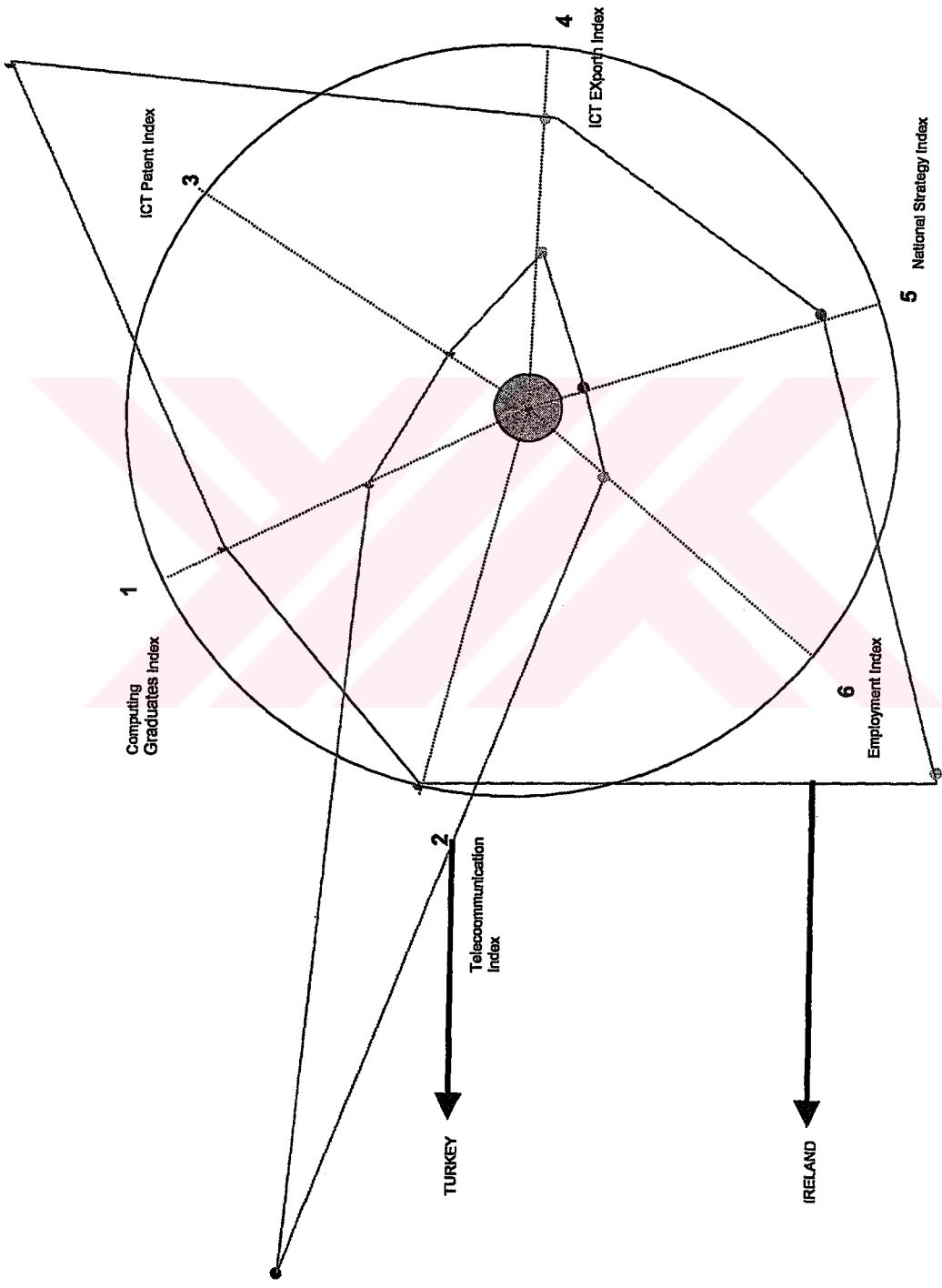
### **5.1.3.1. National Strategy Indicator Index**

National Strategy Indicator are divided into 7 sub-indicators:

- Documents-Master Plans
- Effectiveness of Documents
- Targets
- Time-scale
- Electronic Authentication
- Resources
- Effectiveness of ICT Organization

#### **5.1.3.1.1. Methodology for National Strategy Indicator Index**

No country was taken as 100 in evaluating National Strategy Indicator Index. Current situation of Turkey and Ireland are presented in Table 9. Based on personal judgmental scoring, a value between "0" and "100" was given to each sub-indicator. Averages of all sub-indicators were taken as index value. These index values are written in the column in Table 22.



**Figure 12** Footprint Diagram for ICT Paradigms Indicators



**Table 23 National Strategy Sub-Indicators**

Indicator	Turkey	Ireland
Documents-Master Plans	TUENA, ICT Convention, 8.th five yeared Development Report, Special Commission Reports,	FORFAS
Effectiveness of Document-Master Plans	Necessary actions are not taken. These documents are behaved just as information giving documents.	Documents are effective in policy making.
Electronic Authentication <sup>1</sup>	Electronic Data, Electronic Contract and Electronic Signature Draft Law is ready.	Electronic Commerce Act July 2000
Resources	ICT Organizations are not effective in supporting resources. <sup>2</sup>	Science Foundation Ireland is effective in supporting resources. <sup>3</sup>
Effectiveness of public ICT Organizations in policy making	Public ICT Organizations are partially effective <sup>4</sup>	Public ICT Organizations are effective
Effectiveness of civil ICT Organizations in policy making	Civil ICT Organizations are effective	Civil ICT Organizations are not effective

<sup>1</sup> Source: Dijital İmza ve Yasal Düzenleme Yaklaşımları

<sup>2</sup> See Effectiveness of organizations in Turkey

<sup>3</sup> See "Science Foundation Ireland" part

<sup>4</sup> See Effectiveness of organizations in Turkey

**Table 24** Index Values for National Strategy Indicators

<b>Indicator</b>	<b>Turkey</b>	<b>Ireland</b>
Documents-Master Plans	100	100
Effectiveness of Document	10	100
Electronic Authentication	25	100
Resources	5	100
Effectiveness of public ICT Organization	20	100
Effectiveness of civil ICT Organizations in policy making	80	20
Total	240	520
Average	40	87

#### **5.1.4. Evaluation of Footprint Analysis**

Result of Footprint Analysis shows that Turkey is behind Ireland based on most indicators. In the context of telecommunication index, which is the share of telecommunication revenues in GDP, Turkey is in front of Ireland in telecommunications index in ICT paradigm group and in television receivers index in physical infrastructure and usage group. There is a gap between Turkey and Ireland about the following indicators, and this gap can be closed in a few years if necessary actions are taken:

- Telephone Network
- Mobile Telephone Subscribers
- Literacy Share
- ICT Patent
- National Strategy

There is a very big gap between Turkey and Ireland about the following indicators, and it may take some years to close this gap.

- Personal Computer Index
- Internet Hosts Index
- Internet Access Index
- E-commerce Index
- ISDN Subscribers Index
- Cable TV Index
- ICT Export Index
- ICT strategic alliances Index

- Employment Index

What is remarkable about these diagrams is the absence of a strong causal relationship between the development of different features of ICT production and use. These are a number of possible combinations of infrastructure, experience and skills that can be used to develop “knowledge societies”.



## **CHAPTER 6**

### **POLICIES THAT TURKEY SHOULD FOLLOW**

Results of footprint analysis shows that Turkey is far away from Ireland based on selected indicators. This result also shows that Turkey should take some actions immediately in order to close this gap between not only Ireland and also the other leading countries.

Turkey should target a vision, which is parallel to TUENA master plan, based on following points:

- The infrastructure should maximize general socio-economic benefits for a sustainable human development.
- The national/local value added of the Turkey's ICT industries should make a leapfrog jump.
- Turkey should make leadership in her region in order to get a share from global ICT market.
- Turkey should be able to develop policies and organizational structures to reach above-mentioned vision.

The reasons that Turkey has this capability were set out as follows in TUENA Masterplan;

- Turkey has created a considerable original telecommunications (production and application) experience.

- It has managed to keep its telecommunications infrastructure investments, 85 percent of which it finances from domestic resources, at 1 percent of its gross domestic product.
- It has overtaken many OECD countries in terms of the level of digitalisation.
- Turkey has begun to sell locally manufactured digital exchanges to the Central Asian republics.

### **6.1. Enabling electronic commerce**

Electronic commerce will migrate towards those countries, which have the lowest cost, high quality telecommunications and Internet services, supportive legal and business regimes, and a highly entrepreneurial and technically skilled workforce.

In this e-commerce index, the role of Turkey lies in the removal of barriers to electronic commerce and in the modification of a legal framework designed for traditional towards an on-line trading relationship in order to deal better with the new technologies and markets.

As electronic commerce begins to displace traditional trading methods new demands will emerge for entrepreneurial talents to exploit new opportunities and for new skill-bases. Since small office/home office workers are one of the fastest growing sectors of the electronic workforce, special attention should be given to initiatives, which promote self-sufficiency and potential among the disabled as well as non-traditional workers. Commitment to training, as well as attracting knowledge workers is important.

Electronic Data, Electronic Contract and Electronic Signature Draft Law should be accepted.

## **6.2. Information Rich and Information Poor Gap**

In order to close “information rich” and “information poor” gap, following subjects should be considered in policy making for ICT.

- A social and economic policy which raise purchasing power of certain low income segments in order to avoid them from being excluded in the future's knowledge society.
- Regulatory mechanisms to implement universal access principle should be created especially for rural population, low-income groups and for newcomers to big cities.
- Universal access principle should be put in all regulatory legislations and the government as well as the regulator should be kept responsible for attaining it.
- Communication/community centers should be set up under a separate masterplan (TUENA).

As a result;

Public and civil organizations should work in participation. ICTs can be the future of Turkey.

ICTs are very strategic for Turkey, Turkey must be a good ICT user but also an ICT producer.

Turkey has the opportunity to employ its relatively high number of technical graduates. Turkey has the necessary human capital in order to be a leading country in ICTs.

Government should follow strong policies in order to develop a “knowledge society” with a global vision.

Turkey has a chance to be the ICT center in her region. Urgent actions must be taken into consideration not to miss this chance.

## **CHAPTER 7**

### **CONCLUSION**

Key features of effective national ICT strategies are the capabilities to assess strengths and to target areas for more effectively producing or using ICTs that are responsive to development goals. This is especially important for the least developed countries (Mansell and Wehn 1998).

The diffusion of ICTs between the industrialised and developing countries and disparities between and also within the developing countries lead to concerns about the way to reduce gaps in the accessibility and affordability of these new technologies. The use of advanced ICTs has become the most significant driver of world economic growth. ICTs are the catalysts through which enterprise, whether traditional or new, can create competitive advantage for its products and services on world markets.

However, choosing an effective national ICT strategy is difficult for developing countries because a key feature of the social and economic transition towards 'knowledge societies' is the opening of domestic economies to international trade.

for many developing countries, local IT production may continue to be out of reach for some time to come...For them the priority should be on using IT to revitalize and transform traditional, less technologically demanding industries, and to modernize their basic infrastructure and services (Hanna et al.1996 214).



Wealth generation is becoming more closely tied to the capacity to add value using ICT products and services. The value of information and accumulated knowledge within developing countries is an important aspect of future growth potential. Only a very few developing countries have succeeded in narrowing the development 'gap' by harnessing the production or use of ICTs to their development goals. These technologies do not offer a magical potion that can be expected to provide a cure for the sick, to prevent environmental degradation, or to create jobs. However, if these technologies can be combined with domestic and external human resources, they can be instrumental in achieving major changes in the organization of industrial activity and the conduct of everyday life in developing countries. This requires national ICT strategies that build upon the strengths of each country. Mapping and measuring the economic and social impact of ICTs, and the strengths and weaknesses of technological and social capabilities in developing countries will become an important tool for generating the information needed for informed policy choices.

According to the results of TUENA Survey, household population of Turkey wants to use the National Information Infrastructure extensively. Turkey shows an uneven distribution of communication technologies and services among its population. Large differences exist within social groups, whereas nearly 77% of all computers are owned by 40% of all households belonging to the highest socio-economic status groups. The low economic status group with around 40% of the households owns only 10% of all computers.

Ireland is successful in ICTs usage and production. She has become the European manufacturing and distribution centre for the software of many of the world's top software vendors, accounting for over 40% of all packaged software and 60% of all business software sold in Europe. Ireland has the largest ICT-producing sector

relative to GDP and is the only OECD country in which ICT manufacturing activities are mainly oriented towards computer and related equipment.

Result of Footprint Analysis shows that Turkey is far away from Ireland based on most indicators. Ireland is a leading country in ICTs, while Turkey is at the end.

Ireland is successful in ICTs usage and production, but the reason is not just the effectiveness of ICTs mechanisms. In Ireland, public policy mechanisms are very effective too. In order to increase ICTs usage and production in Turkey, the restructuring of ICT mechanisms is not enough, restructuring of all the mechanisms of Turkish policies in every field is required. ICTs are very strategic for Turkey, Turkey must be a good ICT user but also an ICT producer.

For the future studies;

- Technopark policies of Ireland and Turkey should be compared,
- In order to compare Turkey and Ireland point data (a specific dated data) is used. A year is taken as "base" and the current situation of two countries are compared. Trend analysis (trend in a specific period) is not used. Trend analysis method should be used for Footprint analysis in order to see the trend in the indicators.
- Sub sectors of ICT should be searched in order to compare Ireland and Turkey on sectoral base in a detailed way.

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